STIC Search Report
EIC 3600

STIC Database Tracking Number: 163905

TO: Andrew Fischer
Location: 5C05
Art Unit : 3627

Case Serial Number: 09/832576

From: Bode Akintola
Location: EIC 3600
KNX 4 B 59
Phone: 571-272-3514

Olabode.akintola@uspto.gov

Search Notes

Examiner Andrew,

Please find enclosed the results of your search request.

If you need a refocus, please feel free to contact me.

Thanks,

Bode

Considered
AF 2/6/06

105

EIC 3600 COMMERCIAL DATABASE SEARCH REQUEST

Staff Use Only
Access DB# 163905

☐ **RUSH - SPE signature required:** ______________

Business Methods Case: 705/ 28, Cross 705/22,29,30,34 Log Number: ________
Write in 705 subclass(es) to search required files for 705 cases or cases cross referenced in 705.

Requester's Full Name: Andrew Fischer Examiner # : 75586 Date: August 28, 2005

Art Unit: 3627 Phone Number: (571) 272-6779 Serial Number: 09/832,576

Bldg & Room #: Knox 5C-05 Results Format Preferred: PAPER ☒ DISK ☐ E-MAIL ☐

If more than one search is submitted, please prioritize searches in order of need.

Provide the PALM Bib page or the following: (Total Pages including this sheet: 9)

Title of Invention: Bib Data Sheet Attached

Inventors (provide full names) : ______________

Earliest Priority Filing Date: April 11, 2001; preferably before April 11, 2000

Requested attachments:

- If possible, provide the cover sheet, the IDS, examples, or relevant citations, authors, etc, if known.
- Please attach copies of the parts of this case that help explain or are most pertinent to this search. Examples are: ***abstract, background, summary, claim(s) [not all of the claims].***

Abstract, Background & Summary of the Invention, and claim 19 included.

The claimed or apparent novelty of the invention is:

Using at least two time widows and planning horizons to determine safety or buffer stocks.

This search should focus on:

(Also include keywords or synonyms)

Ways and methods of determining safety or lean buffer stocks using demand and production values.

If you have any questions or need help with keywords, please feel free to contact me.

Special Instructions or Other Comments

COMPLETE INTERNET & PRIOR ART SEARCH REQUESTED

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 3619

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/832,576	04/11/2001 RULE	705	2167	020431.0788

APPLICANTS

Timothy R. Hayes, Plano, TX;

** CONTINUING DATA ************************* None AJ

** FOREIGN APPLICATIONS ******************** None AJ

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 06/05/2001

Foreign Priority claimed / 35 USC 119 (a-d) conditions met / Verified and Acknowledged	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ yes ☒ no; 35 USC 119 (a-d) conditions met ☐ yes ☒ no ☐ Met after Allowance; Verified and Acknowledged AJ Fischer — Examiner's Signature, Initials	TX	3	21	6

ADDRESS

Christopher W. Kennerly, Esq.
Baker Botts L.L.P.
2001 Ross Avenue, 6th Floor
Dallas ,TX 75201-2980

TITLE

System and method for lean inventory management

FILING FEE RECEIVED		
968	FEES: Authority has been given in Paper No. ________ to charge/credit DEPOSIT ACCOUNT No. ________ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other ________ ☐ Credit

SYSTEM AND METHOD FOR LEAN INVENTORY MANAGEMENT

ABSTRACT OF THE DISCLOSURE

A system (100) for inventory management includes memory (116) containing a cumulative demand value (252) for each of a plurality of time windows (204) within a planning horizon (200). The cumulative demand value (252) for a time window (204) represents a cumulative demand for at least one product over the time window (204) and all previous time windows (204) in the planning horizon (200). The memory (116) also includes a cumulative production value (254) for each time window (204). The cumulative production value (254) for a time window (204) represents a cumulative quantity of the product that can be manufactured over the time window (204) and all previous time windows (204) in the planning horizon (200). The system (100) also includes one or more processors (114) collectively operable to determine a lean buffer stock value using the cumulative demand values (252) and the cumulative production values (254). The lean buffer stock value represents a quantity of the product to use as a lean buffer stock for the planning horizon (200). The one or more processors (114) are also collectively operable to make the lean buffer stock value available for use in manufacturing the product.

BACKGROUND OF THE INVENTION

In the manufacturing industry, different paradigms and manufacturing models impose different rules on the manufacture of a product. One of these manufacturing models is called "lean manufacturing" or "lean inventory management." The lean manufacturing model attempts to eliminate waste in the manufacturing process by creating a stable production environment. One way of creating stability involves imposing a leveling constraint in the production environment. Production of a product may occur during a period of time, which may be divided into multiple windows or "buckets" of time. A leveling constraint dictates that the same amount of the product should be produced during each time window.

The lean manufacturing model attempts to remain responsive to customer needs, supplying customers with products when the customers need the products, while eliminating waste in the production environment. One way manufacturers attempt to maintain responsiveness is to store some quantity of a product in inventory as "safety stock." Because manufacturers typically cannot predict customer demand for a product with absolute certainty, forecasts or predictions of customer demand typically include some amount of error. The forecast error means that customer demand for the product may be higher or lower than predicted. Safety stock helps protect the manufacturer when customer demand for the product is higher than expected. When the manufacturer cannot produce enough of the product to satisfy the higher customer demand, the manufacturer may use the safety stock to meet the customer demand.

A problem with this approach is that safety stocks typically fail to protect a manufacturer from both forecast error in the demand forecast and customer demand spikes. A customer demand spike refers to a period when demand for a product is greater than surrounding time periods. In some lean manufacturing environments, the goal is to produce the same amount of a product during each window of time. When a customer demand spike occurs during later time windows, the manufacturer may produce enough of the product during the earlier time windows to meet this higher demand. When a customer demand spike occurs during earlier time windows, the manufacturer may be unable to produce enough of the product to meet this early demand. While safety stocks may protect a manufacturer against early customer demand for a product, it typically cannot protect the manufacturer both from forecast error in the demand forecast and from early customer demand spikes.

This leaves the manufacturer vulnerable to "stock-outs," or times when the manufacturer cannot meet customer demand because no product is in stock.

Another problem with this approach is that identifying a quantity of a product to protect against both forecast error in the demand forecast and customer demand spikes is difficult. It is often a simple task to identify a quantity of a product to use as a safety stock. A manufacturer typically uses the average and standard deviation of customer demand for a product to determine an appropriate size for the safety stock. It is typically more difficult to identify a quantity of a product to protect against customer demand spikes in a lean manufacturing environment. The amount of inventory needed to protect against customer demand spikes is typically unrelated to the forecast error of the demand forecast. As a result, manufacturers often attempt to guess how much inventory is needed to protect against customer demand spikes, which typically results in inaccurate estimates. When demands associated with multiple customers are considered, it becomes even more difficult to predict the quantity of the product needed to protect against customer demand spikes, which results in even more inaccurate estimates.

As a result of any of these or other disadvantages, previous lean inventory management techniques have been inadequate in many manufacturing environments.

SUMMARY OF THE INVENTION

According to the present invention, problems and disadvantages associated with previous lean inventory management techniques have been substantially reduced or eliminated.

According to one embodiment of the present invention, a system for inventory management includes memory containing a cumulative demand value for each of a plurality of time windows within a planning horizon. The cumulative demand value for a time window represents a cumulative demand for at least one product over the time window and all previous time windows in the planning horizon. The memory also includes a cumulative production value for each time window. The cumulative production value for a time window represents a cumulative quantity of the product that can be manufactured over the time window and all previous time windows in the planning horizon. The system also includes one or more processors collectively operable to determine a lean buffer stock value using the cumulative demand values and the cumulative production values. The lean buffer stock value represents a quantity of the product to use as a lean buffer stock for the planning horizon. The one or more processors are also collectively operable to make the lean buffer stock value available for use in manufacturing the product.

In another embodiment of the invention, a method for inventory management includes determining a cumulative demand value for each of a plurality of time windows within a planning horizon. The cumulative demand value for a time window represents a cumulative demand for at least one product over the time window and all previous time windows in the planning horizon. The method also includes determining a cumulative production value for each time window. The cumulative production value for a time window represents a cumulative quantity of the product that can be manufactured over the time window and all previous time windows in the planning horizon. The method further includes determining a lean buffer stock value using the cumulative demand values and the cumulative production values. The lean buffer stock value represents a quantity of the product to use as a lean buffer stock for the planning horizon. In addition, the method includes making the lean buffer stock value available for use in manufacturing the product.

Numerous technical advantages are provided according to various embodiments of the present invention. Particular embodiments of the invention may exhibit none, some, or all of

the following advantages. For example, the present invention may allow a manufacturer to determine an appropriate amount of inventory needed to protect the manufacturer from customer demand spikes. The manufacturer may identify the amount of inventory to keep as a "lean buffer stock," which may be used to protect the manufacturer from early customer demand spikes. This helps to reduce the likelihood that a manufacturer will suffer a "stock-out" and be unable to meet customer demand for a product. In a lean manufacturing environment, the present invention helps protect the manufacturer even when a customer demand spike occurs during earlier windows of time. To provide an additional layer of protection, the manufacturer may also keep some quantity of the product in inventory as a safety stock, which protects the manufacturer from forecast error in the demand forecast, such as when customer demand exceeds the manufacturer's predicted demand.

The present invention may also be used in environments where multiple customers have changing demand needs and differing demand spikes. This provides even greater protection to the manufacturer.

Other technical advantages are readily apparent to one of skill in the art from the attached figures, description, and claims.

IN THE CLAIMS:

A complete listing of the claims is set forth below. Please amend the claims as follows:

1. **(Cancelled).**
2. **(Cancelled).**
3. **(Cancelled).**
4. **(Cancelled).**
5. **(Cancelled).**
6. **(Cancelled).**
7. **(Cancelled).**
8. **(Cancelled).**
9. **(Cancelled).**
10. **(Cancelled).**
11. **(Cancelled).**
12. **(Cancelled).**
13. **(Cancelled).**
14. **(Cancelled).**
15. **(Cancelled).**
16. **(Cancelled).**
17. **(Cancelled).**
18. **(Cancelled).**
19. **(Previously Presented)** A computer-implemented method for inventory management, the method performed using a computer system comprising one or more processing units and one or more memory units, the method comprising:

using the computer system, determining a cumulative demand value for each of a plurality of time windows within a first planning horizon, the cumulative demand value for a time window representing a cumulative demand for at least one product over the time window and all previous time windows in the first planning horizon;

using the computer system, determining a first forecasted production quantity value for the first planning horizon using a first total forecasted demand value that represents total demand for the product during the first planning horizon, the first forecasted production quantity value representing an estimated quantity of the product to be manufactured during each time window of the first planning horizon;

using the computer system, determining a cumulative production value for each time window of the first planning horizon using the first forecasted production quantity value, the cumulative production value for a time window representing a cumulative quantity of the product that can be manufactured over the time window and all previous time windows in the first planning horizon;

using the computer system, determining a first lean buffer stock value using the cumulative demand values and the cumulative production values for the first planning horizon, the first lean buffer stock value representing a quantity of the product to use as a lean buffer stock for the first planning horizon;

using the computer system, determining a cumulative demand value for each of a plurality of time windows within a second planning horizon preceding the first planning horizon;

using the computer system, determining a second forecasted production quantity value for the second planning horizon using the first lean buffer stock value and a second total forecasted demand value that represents total demand for the product during the second planning horizon;

using the computer system, determining a cumulative production value for each time window of the second planning horizon using the second forecasted production quantity value;

using the computer system, determining a second lean buffer stock value using the cumulative demand values and the cumulative production values for the second planning horizon, the second lean buffer stock value representing a quantity of the product to use as a lean buffer stock for the second planning horizon; and

using the computer system, making the first and second lean buffer stock values available for use in manufacturing the product.

Set	Items	Description
S1	1386	(SAFETY OR BUFFER)(2N)STOCK? ?
S2	18854	INVENTORY OR INVENTORIES
S3	108219	DEMAND
S4	1309673	SUPPLY OR SUPPLIES OR PRODUCE OR PRODUCTION OR MANUFACTUR?
S5	740840	CUMULATIVE OR AGGREGAT? OR TOTAL?
S6	1149702	VALUE? ? OR QUANTITY OR QUATITIES OR AMOUNT
S7	1301780	TIME OR PERIOD? OR DURATION? ?
S8	76	S1(S)S2
S9	1317	S5(4N)S3
S10	9	S1(S)S9
S11	12705	S4(3N)S5
S12	7	S1(S)S11
S13	50	S8(30N)(S3 OR S4)
S14	30	S13(30N)S7
S15	35	S10 OR S12 OR S14
S16	30	S15 AND IC=G06F?

? show file
File 348:EUROPEAN PATENTS 1978-2005/Aug W03

File 349:PCT FULLTEXT 1979-2005/UB=20050825,UT=20050818

Considered ag7 2/6/08

16/3,K/1   (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01434586
Electronic procurement system
Elektronisches Bestellungssystem
Systeme electronique d'acquisition
PATENT ASSIGNEE:
  ITT MANUFACTURING ENTERPRISES, INC., (3013791), 1105 North Market Street, Wilmington, Delaware 19801, (US), (Applicant designated States: all)
INVENTOR:
  Aram, Paul Richard, 26 Princes Road, Ealing, London W13 9AS, (GB)
LEGAL REPRESENTATIVE:
  Collins, John David (74592), Marks & Clerk, 57-60 Lincoln's Inn Fields, London WC2A 3LS, (GB)
PATENT (CC, No, Kind, Date): EP 1215607 A2 020619 (Basic)
                              EP 1215607 A3 040331
APPLICATION (CC, No, Date):   EP 2001310158 011205;
PRIORITY (CC, No, Date): GB 30422 001213
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: **G06F-017/60**
ABSTRACT WORD COUNT: 234
NOTE:
  Figure number on first page: 2

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200225	6816
SPEC A	(English)	200225	20128
Total word count - document A			26944
Total word count - document B			0
Total word count - documents A + B			26944

INTERNATIONAL PATENT CLASS: **G06F-017/60**

...SPECIFICATION Normally the scheduling is arranged to provide a minimum stock at the distributor, with a **safety** level of **stock** being held at the supplier.

The **manufacturer** or distributor is effectively able to operate an improved "just in **time** " **manufacturing** or distribution system in which items for onwards shipment to a customer or parts for the items, remain for a minimal **time** in the physical possession of the manufacturer/distributor.

The manufacturer or distributor also benefits through...1320.

Table 1304 of the demand schedule indicates, week-by-week in the illustrated example, **total** **demand** for the selected part, split into actual demand and forecast demand as described above. The...available" figure is calculated but not displayed. This figure represents the distributor's on-hand **stock** , less the **safety** **stock** level, less the **total** (**cumulative**) **demand** so that, for example, as of 13 July 2000, in the example (-528) units (=407...

...including the web pages for stock load 802, stock transfer 804, inventory by location 806, **demand** schedule 808, parts look-up 814 and **safety** **stock** 816.

In more detail **demand** graph 1350 includes a drop-down list 1352 for

selecting a number of a part provided by the supplier. A **demand** graph for the selected part is then presented to the supplier.

Referring in more detail to Figure 13b, the demand graph has an x axis 1354 denoting **time** and a y axis 1356 denoting units of stock. The time axis preferably begins at...

...a level of demand for the selected part corresponding, in a preferred embodiment, to the " **Total Demand** " column of **demand** schedule 1300 (although the values illustrated by demand graph 1350 have been selected to illustrate...

...described in more detail below, and a third, optional curve 1358, shows a level of **safety stock** for the selected part which, as shown, will usually be flat. Although in the illustrated...by purchase orders with suppliers at the date (excluding overdue purchase orders) and subtracting the **cumulative** customer **demand** for the stocked part at the date. This can be used for constructing a stock...

...way to overdue work-in-progress, as described with reference to Figure 13b. Optionally a **safety** level of **stock** at the distributor may also be included on the demand graph.

A demand graph constructed...

16/3,K/2 (Item 2 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01434566
Supply management system
System zur Versorgungsverwaltung
Systeme pour la gestion d'alimentation
PATENT ASSIGNEE:
ITT MANUFACTURING ENTERPRISES, INC., (3013791), 1105 North Market Street, Wilmington, Delaware 19801, (US), (Applicant designated States: all)
INVENTOR:
Aram, Paul Richard, 26 Princes Road, Ealing, London W13 9AS, (GB)
LEGAL REPRESENTATIVE:
Martin, Philip John (94151), Marks & Clerks, 57-60 Lincoln's Inn Fields, London WC2A 3LS, (GB)
PATENT (CC, No, Kind, Date): EP 1215606 A1 020619 (Basic)
APPLICATION (CC, No, Date): EP 2001310037 011130;
PRIORITY (CC, No, Date): GB 30422 001213; GB 105744 010308
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: **G06F-017/60**
ABSTRACT WORD COUNT: 249
NOTE:
Figure number on first page: 16

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200225	1026
SPEC A	(English)	200225	18368
Total word count - document A			19394
Total word count - document B			0
Total word count - documents A + B			19394

INTERNATIONAL PATENT CLASS: **G06F-017/60**

...SPECIFICATION Normally the scheduling is arranged to provide a minimum stock at the distributor, with a **safety** level of **stock** being held at the supplier.

The **manufacturer** or distributor may thus operate an improved "just in **time** " **manufacturing** or distribution system in which items for onwards shipment to a customer or parts for the items, remain for a minimal **time** in the physical possession of the manufacturer/distributor.

The manufacturer or distributor also benefits through...1320.

Table 1304 of the demand schedule indicates, week-by-week in the illustrated example, **total** **demand** for the selected part, split into actual demand and forecast demand as described above. The...

...available" figure is calculated but not displayed. This figure represents the distributor's on-hand **stock** , less the **safety** **stock** level, less the **total** (**cumulative**) **demand** so that, for example, as of 13 July 2000, in the example (-528) units (=407...a level of demand for the selected part corresponding, in a preferred embodiment, to the " **Total** **Demand** " column of **demand** schedule 1300 (although the values illustrated by demand graph 2200 have been selected to illustrate...

...described in more detail below, and a third, optional curve 2208, shows a level of **safety** **stock** for the selected part which, as shown, will usually be flat.

To generate the demand...by purchase orders with suppliers at the date (excluding overdue purchase orders) and subtracting the **cumulative** customer **demand** for the stocked part at the date. This can be used for constructing a stock...

...way to overdue work-in-progress, as described with reference to Figure 22. Optionally a **safety** level of **stock** at the distributor may also be included on the demand graph.

A demand graph constructed...

16/3,K/3 (Item 1 from file: 349)

DIALOG(R)File 349:PCT FULLTEXT

01219865 **Image available**

DATA STORAGE ANALYSIS MECHANISM

MECANISME D'ANALYSE DE SYSTEME DE MISE EN MEMOIRE DE DONNEES

Patent Applicant/Assignee:
  VERITAS OPERATING CORPORATION, 350 Ellis Street, Mountain View, CA 94043, US, US (Residence), US (Nationality), (For all designated states except: US)

Patent Applicant/Inventor:
  KAISER Scott Douglas, 1500 Floribunda Avenue, Apartment 201, Burlingame, CA 94010, US, US (Residence), US (Nationality), (Designated only for: US)

Legal Representative:
  KOWERT Robert C (agent), Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C., P.O. Box 398, Austin, TX 78767-0398, US,

Patent and Priority Information (Country, Number, Date):

Patent:	WO 200526942 A2 20050324	(WO 0526942)
Application:	WO 2004US29359 20040909	(PCT/WO US04029359)
Priority Application:	US 2003659891 20030911	

Designated States:

(All protection types applied unless otherwise stated - for applications

2004+)
AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM
DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO
RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PL PT RO
SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) BW GH GM KE LS MW MZ NA SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 11226

Main International Patent Class: **G06F-003/06**
Fulltext Availability:
Detailed Description

Detailed Description
... S X (P + 1)112)
where.

cycle stock inventory kept on hand to meet expected **demand** for a
period
safety **stock** **inventory** kept on hand to handle variation
Demand
s Standard deviation of **demand**
p **Periodicreviewtime**
1 Leadtimetoacquirenewinventory
z Risk tolerance that may vary based on risk tolerance for stockouts
[00641 Note that the above exemplary **inventory** model is applicable to
non-pooled storage such as DAS systems, systems with single applications
...

...Si2)1/2
i=1
where.

cycle stock inventory kept on hand to meet expected **demand** for a
period
safety **stock** **inventory** kept on hand to handle variation
/,t **Demand**
s Standard deviation of **demand**
p **Periodic** review **time**
1 Lead **time** to acquire new **inventory**
z Risk tolerance that may vary based on risk tolerance for stockouts
1 3
[0065...

16/3,K/4 (Item 2 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01203545 **Image available**
SYSTEM AND METHOD FOR OPTIMIZING SOURCING OPPORTUNITY UTILIZATION POLICIES
SYSTEME ET PROCEDE PERMETTANT D'OPTIMALISER LES REGLES D'ACTION REGISSANT L'UTILISATION D'OPPORTUNITES DE SOURCAGE
Patent Applicant/Assignee:
VIVECON CORPORATION, 707 California Street, Mountain View, California

94041, US, US (Residence), US (Nationality), (For all designated states except: US)

Patent Applicant/Inventor:

JOHNSON Blake, Vivecon Corporation, 707 California Street, Mountain View, California 94041, US, US (Residence), US (Nationality), (Designated only for: US)

BENAVIDES Dario, Vivecon Corporation, 707 California Street, Mountain View, California 94041, US, US (Residence), CL (Nationality), (Designated only for: US)

PIEPER Heiko, Vivecon Corporation, 707 California Street, Mountain View, California 94041, US, US (Residence), DE (Nationality), (Designated only for: US)

KESSINGER Colin, Vivecon Corporation, 707 California Street, Mountain View, California 94041, US, US (Residence), US (Nationality), (Designated only for: US)

GRAY Allan, Vivecon Corporation, 707 California Street, Mountain View, California 94041, US, US (Residence), GB (Nationality), (Designated only for: US)

Legal Representative:

YEE Susan (et al) (agent), Carr & Ferrell LLP, 2200 Geng Road, Palo Alto, California 94303, US,

Patent and Priority Information (Country, Number, Date):

Patent: WO 200510706 A2 20050203 (WO 0510706)
Application: WO 2004US23326 20040719 (PCT/WO US04023326)
Priority Application: US 2003621726 20030717

Designated States:
(All protection types applied unless otherwise stated - for applications 2004+)

AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) BW GH GM KE LS MW MZ NA SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM

Publication Language: English
Filing Language: English
Fulltext Word Count: 11145

Main International Patent Class: **G06F**
Fulltext Availability:
Detailed Description

Detailed Description

... result from an opportunity to enter into a supply agreement that provides guaranteed availability of **supply** at short lead times in exchange for a higher purchase price. Alternatively, a high service level may also be achieved through a sourcing strategy that includes maintenance of significant **inventory** **safety** **stocks** over **time** .

9

Thus in this example, a high service level may be achieved with two alternative...upon which the optimal SOUP draws are utilized including, analysis of such utilization policies over **time** and across prospective future circumstances. For example, an optimal SOUP may utilize one or more sourcing opportunities to build a substantial **buffer** **stock** of **inventory** in advance of a projected seasonal increase in **demand** , or of an anticipated increase in the price of, or decrease in availability of, **supply** . If such an **inventory** strategy is identified as a component of

an optimal SOUP, before implementation of the SOUP...

16/3,K/5 (Item 3 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01121547 **Image available**
DEVELOPMENT ENVIRONMENT FOR LEARNING AGENTS
MOTEUR DE PRODUCTION D'AGENTS
Patent Applicant/Assignee:
SAP AKTIENGESELLSCHAFT, Neurottstrasse 16, 69190 Walldorf, DE, DE (Residence), DE (Nationality), (For all designated states except: US)
Patent Applicant/Inventor:
ROEDIGER Karl Christian, 21 Rimalt Street, Appartment 10, 43730 Ra'anana, IL, IL (Residence), IL (Nationality), (Designated only for: US)
Legal Representative:
SCHNEIDER Gunther M (agent), Bettinger Schneider Schramm, Postfach 86 02 67, 81629 Munchen, DE,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200444734 A2-A3 20040527 (WO 0444734)
Application: WO 2003EP12597 20031111 (PCT/WO EP03012597)
Priority Application: US 2002426246 20021113; US 2002328855 20021224
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) BW GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 14314

Main International Patent Class: **G06F-009/44**
Fulltext Availability:
Detailed Description

Detailed Description
... and/or comprise only slow moving items that are heavily discounted;
Opportunities to push surplus **inventory** to retail store with different consumer behavior/demographics;
Ways to improve **supply** chain synchronization such as more effective ordering patterns and, supplier performance evaluations; and ways to sense in real- **time** or on a regular basis (e.g., daily basis) actual consumption patterns such as connectivity...

16/3,K/6 (Item 4 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01112380 **Image available**

SYSTEMS AND METHODS FOR PLANNING, SCHEDULING, AND MANAGEMENT

SYSTEMES ET PROCEDES PERMETTANT D'AMELIORER LA PLANIFICATION, LA PROGRAMMATION ET LA GESTION DE CHAINE D'APPROVISIONNEMENT

Patent Applicant/Assignee:
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Patent Applicant/Inventor:
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JENNINGS Otis, 5335 Triangle Parkway, Suite 210, Norcross, GA 30093, US, US (Residence), US (Nationality), (Designated only for: US)
GRAVES Steve, 5335 Triangle Parkway, Suite 210, Norcross, GA 30093, US, US (Residence), US (Nationality), (Designated only for: US)
GREENBERG Ian, 5335 Triangle Parkway, Suite 210, Norcross, GA 30093, US, US (Residence), US (Nationality), (Designated only for: US)
BISHOP John, 5335 Triangle Parkway, Suite 210, Norcross, GA 30093, US, US (Residence), US (Nationality), (Designated only for: US)

Legal Representative:
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Patent and Priority Information (Country, Number, Date):
Patent: WO 200434305 A2-A3 20040422 (WO 0434305)
Application: WO 2003US32493 20031014 (PCT/WO US03032493)
Priority Application: US 2002418399 20021011

Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ
EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK
LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH PL PT RO RU SC
SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG

(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM

Publication Language: English
Filing Language: English
Fulltext Word Count: 15312
Main International Patent Class: **G06F-019/00**
Fulltext Availability:
Detailed Description
Claims

Detailed Description
... way of further example, an optimization method such as optimize dollar fill rate 704 sets **safety stocks** to maximize the percentage of demand on a monetary basis that is filled from stock...

...different items will vary according to their unit values, lot sizes, demand rates and **demand** variability, optimizing the **aggregate** service may result in different service levels by item.

Further, an optimization method such as...

Claim
... i) based on investment in the safety stock and expected number of stock outs per **period** of a predefined amount of **time** , determining a penalty cost curve; and 0) displaying a portion of the **inventory** data for the items and the penalty cost curve.

10 A method for managing inventory of different types of items in a **supply**
chain, the method comprising:
(a) receiving inventory data for items of a first type at...

16/3,K/7 (Item 5 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01068791 **Image available**
DECISION SUPPORT SYSTEM FOR SUPPLY CHAIN MANAGEMENT
SYSTEME D'AIDE A LA DECISION DESTINE A LA GESTION DE CHAINE D'APPROVISIONNEMENT
Patent Applicant/Assignee:
NEXGENIX INC, c/o Stradling Yocca Carlson & Rauth, 660 Newport Center Drive, Suite 1600, Newport Beach, CA 92660, US,
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MANTRI Shirish, 4 Luna Court, Ladera Ranch, CA 92694, US,
JOSEPH Sojan, 25 Golden Star, Irvine, CA 92604, US,
JOSHI Ganshyam, 51 Radiance Lane, Rancho Santa Margarita, Ca 92688, US,
Legal Representative:
SWIENTON Brian F (agent), Oppenheimer Wolff & Donnelly LLP, 840 Newport Center Drive, Suite 700, Newport Beach, CA 92660, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200398517 A1 20031127 (WO 0398517)
Application: WO 2003US15538 20030516 (PCT/WO US0315538)
Priority Application: US 2002466218 20020516
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
Publication Language: English
Filing Language: English
Fulltext Word Count: 13374

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... stock and customer service level, for each classification of products and market segment. Optimization is **time** -phased and may be conducted at each stocking point in the distribution network, considering the desired level of service, **demand** , **supply** variability and lead times; all of which are adaptively informed by exception-based planning and forecast management. **Inventory** planning can be deployed to implement distribution resource planning (DRP), vendor managed **inventory** (VMI),

efficient customer response (ECR), or just-in- **time** (JIT) inventory management techniques through balancing fiscal objectives and customer service priorities. Further, inventory planning...

16/3,K/8 (Item 6 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01049132 **Image available**
INVENTORY MANAGEMENT SYSTEM FOR REDUCING OVERALL WAREHOUSE AND PIPELINE INVENTORY
SYSTEME DE GESTION DES STOCKS POUR REDUIRE LES STOCKS EN ENTREPOTS ET LES STOCKS EN TRANSIT
Patent Applicant/Assignee:
UNITED PARCEL SERVICE OF AMERICA INC, 55 Glenlake Parkway, N.E., Atlanta, GA 30328, US, US (Residence), US (Nationality)
Inventor(s):
PENKAR Rajan C, 315 May Apple Court, Alpharetta, GA 30005, US,
JOHNSON Michael D, 305 Chandon Place Court, Alpharetta, GA 30022, US,
HANLON Larry A, 5580 Commons Lane, Alpharetta, GA 30005, US,
REULBACH Raymond A, 823 Green Trace Court, Lawrenceville, GA 30045, US,
JONES Gina L, 1100 Wilde Run Court, Roswell, GA 30075, US,
CASTAGNO Tony R, 955 Post Oak Close, Alpharetta, GA 30004, US,
Legal Representative:
BRIENT Scott E (et al) (agent), Alston & Bird LLP, Bank of America Plaza, Suite 4000, 101 South Tryon Street, Charlotte, NC 28280-4000, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200379153 A2-A3 20030925 (WO 0379153)
Application: WO 2003US7634 20030311 (PCT/WO US03007634)
Priority Application: US 2002363604 20020311
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT (utility model) AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ (utility model) CZ DE (utility model) DE DK (utility model) DK DM DZ EC EE (utility model) EE ES FI (utility model) FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SC SD SE SG SK (utility model) SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 9447

Main International Patent Class: **G06F-017/60**

English Abstract
...example, guaranteed delivery within one or two days. This reduces the overall pipeline and warehouse **inventory** within the distribution network by reducing the average transit **time** for each part, and by reducing the amount of **safety stock** that is needed to support the operations of the **manufacturing** facilities.

16/3,K/9 (Item 7 from file: 349)

01045218 **Image available**
SUPPLY CHAIN FULFILLMENT COORDINATION
COORDINATION D'EXECUTION DE CHAINE D'APPROVISIONNEMENT
Patent Applicant/Assignee:
SAP AKTIENGESELLSCHAFT, Neurottstrasse 16, 69190 Walldorf, DE, DE (Residence), DE (Nationality)
Inventor(s):
HIRTH Jochen, Dornweg 38, 69488 Birkenau, DE,
KALLE Thomas, Boorweise 27, 54439 Saarburg, DE,
VON HELMOLT Hans-Ulrich, Rohrbacher Strasse 195, 69126 Heidelberg, DE,
Legal Representative:
RICHARDT Markus (et al) (agent), Unter den Eichen 7, 65195 Wiesbaden, DE,

Patent and Priority Information (Country, Number, Date):
Patent: WO 200375195 A2 20030912 (WO 0375195)
Application: WO 2003EP2279 20030306 (PCT/WO EP0302279)
Priority Application: US 2002362382 20020306; US 2002208200 20020731; US 2002282765 20021028
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 20205

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... the customer's product needs, fewer bottlenecks, faster reaction times, and a possible reduction of **safety** **stock** in the **inventory** or warehouse.
The fulfillment coordination engine can be applied to just-in- **time** delivery scenarios, for example, in the automotive industry to control the **supply** logistics between a supplier and a manufacturer. The engine is most useful for direct delivery...

16/3,K/10 (Item 8 from file: 349)

01025682
SUPPLY CHAIN OPTIMIZATION
OPTIMISATION DE CHAINE DE PRODUCTION-DISTRIBUTION
Patent Applicant/Assignee:
ACCENTURE SERVICES LIMITED, 60 Queen Victoria Street, London EC4N 4TW, GB

, GB (Residence), GB (Nationality)
Inventor(s):
BLACKMORE Kevin, 44 Wild Herons, Hook Hants RG27 9SF, GB,
Legal Representative:
FRANK B DEHN & CO (agent), 179 Queen Victoria Street, London EC4V 4EL, GB
,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200354756 A2 20030703 (WO 0354756)
Application: WO 2002IB5580 20021223 (PCT/WO IB0205580)
Priority Application: US 200124525 20011221
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT (utility model) AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ (utility model) CZ DE (utility model) DE DK (utility model) DK DM DZ EC EE (utility model) EE ES FI (utility model) FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SC SD SE SG SK (utility model) SK SL TJ TM TN TR TT TZ UA UG UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LU MC NL PT SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 25991

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... on replenishment options and include replenishment methods, desired service levels, the number of days of **inventory** cover, minimum presentation stock, and the number of replenishment days. Alternatively, the strategies may focus on **supply** chain options including minimum store order quantity, minimum supplier order quantity, supplier to distribution center lead **time** , distribution center to store lead **time** , and distribution center **safety stock** . The detailed graphical and numeric output may be compared to the output for the baseline...all store replenishment methods.

The parameters that control the distribution center replenishment are: Distribution center **Safety Stock** (days cover); Distribution center review time (days)- Supplier to distribution center lead-time (days); Supplier minimum order quantity (units); and **Total demand** forecast check box.

All parameters are defined via the screens 420 and 421, in Fig...may be ordered from a 73
Mnimum, Order supplier.

Quantity
Supplier to DC 74
Lead **Time**
DC **Safety Stock** Number of Weeks cover held by DC 75
DC to Store Lead 76
Time
Number of 77

delivery days per
week
Total **Demand** **Total** **Demand** over the **period** 86
Av. Average Daily Demand in all stores 87
Peak Peak daily demand in all stores 88
SD Standard Deviation of daily **demand** in 89
all stores
Total Sales Total Sales over the period 91
Av. Average Daily Sales in all stores 92 Off Percentage of goods sold 109
Off Sale Percentage of **Time** item was off sale 110
Lost Sale Lost sales expressed as a percentage of III
demand
Av Average DC **Inventory** 112
Peak Peak DC **Inventory** 113
SD Standard deviation in DC **inventory** 114
Push Quantity Amount pushed to each store 136-233
Freq. Frequency of Pulls, number...

16/3,K/11 (Item 9 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01016687 **Image available**
SUPPLY CHAIN NETWORK
RESEAU DE CHAINE D'APPROVISIONNEMENT
Patent Applicant/Assignee:
ISUPPLI CORPORATION, 1700 East Walnut Avenue, El Segundo, CA 90245, US, US (Residence), US (Nationality), (For all designated states except: US)
Patent Applicant/Inventor:
LIDOW Derek, 665 East Channel Road, Santa Monica, CA 90402, US, US (Residence), US (Nationality), (Designated only for: US)
Legal Representative:
FINDER James A (et al) (agent), Ostrolenk, Faber, Gerb & Soffen, LLP, 1180 Avenue of the Americas, New York, NY 10036, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200346696 A2-A3 20030605 (WO 0346696)
Application: WO 2002US38438 20021127 (PCT/WO US0238438)
Priority Application: US 2001333483 20011128
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LU MC NL PT SE SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 20548

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Claims

Claim

... comprising receiving at least one of clean forecasts, past due sales orders, on hand inventories, **safety stock** requirements, and minimum and maximum usage. 151, The method of claim 150, wherein said past... available items represent an undershipment.
183. The method of claim 178, further comprising comparing said **aggregation** of **demand** forecasts with available supply from said plurality of suppliers.
184. The method of claim 178...forecasts.
224. The method of claim 222, further comprising allocating orders that comply with said **aggregation** of **demand** forecasts, and returning orders that do not comply with said **aggregation** of **demand** forecasts.
225. The method of claim 222, further comprising managing

16/3,K/12 (Item 10 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01010804 **Image available**
OPTIMIZING RESOURCE PLANS
OPTIMISATION DE LA PLANIFICATION DES RESSOURCES
Patent Applicant/Assignee:
MANUGISTICS INC, 9715 Key West Ave., Rockville, MD 20850, US, US (Residence), US (Nationality)
Inventor(s):
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HOOKS Michael, 21523 Fox Field Circle, Germantown, MD 20876, US,
BONGARTZ Ingrid, 71 Hansen Avenue, Kanata, Ontario K2K 2L7, CA,
MACMILLAN Robert, 18 Red Oaks, Sittsvile, Ontario K2S 1E2, CA,
GREAMO Christopher A, 5013 V Street, N.W., Washington, DC 20007, US,
Legal Representative:
CROWSON Celine Jimenez (agent), Hogan & Hartson L.L.P., 555 - Thirteenth Street, N.W., Washington, DC 20004-1109, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200340880 A2-A3 20030515 (WO 0340880)
Application: WO 2002US35313 20021105 (PCT/WO US02035313)
Priority Application: US 2001330956 20011105
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LU MC NL PT SE SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 21783

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... customer
service and on time delivery of customer ord@rs. It may include

information regarding **demand** (e.g., **total** customer **demand** , non-consumed forecast, late demand), customer orders (e.g., sales revenues, delivery performance, and average ...SKU projections such as inventory value (e.g., average, minimum, and maximum inventory value, variation), **demand**

coverage (e.g., average, minimum, and maximum **demand** coverage), problems (e.g., periods with negative projective inventory balances or under **safety stock**), and causes of lateness. The resource performance 333 (or resource utilization performance) may be based...

16/3,K/13 (Item 11 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00952522 **Image available**
SYSTEM AND METHOD FOR MANAGING WELDING CONSUMABLES
GESTION DE CONSOMMABLES DE SOUDAGE ET SYSTEME A CET EFFET
Patent Applicant/Assignee:
LINCOLN GLOBAL INC, 1200 Monterey Pass Road, Monterey Park, CA 44024, US, US (Residence), US (Nationality)
Inventor(s):
BLANKENSHIP George Daryl, 12221 Bradford Drive, Chardon, OH 44024, US,
HSU Christopher, 8510 Mansion Boulevard, Mentor, OH 44060, US,
Legal Representative:
AMIN Himanshu S (et al) (agent), Amin & Turocy, LLP, 1900 E. 9th Street, 24th Floor, Cleveland, OH 44114, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200286656 A2-A3 20021031 (WO 0286656)
Application: WO 2002US11017 20020410 (PCT/WO US02011017)
Priority Application: US 2001838970 20010420
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ
EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR
LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI
SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 10406

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... paM upon information obtained from the aggregated welding consumable(s) data (e.g., continuous, real- **time** update of raw materials **inventory** consumption based, at least in part, upon information obtained via the consumable(s) monitor 720).

For example, a source of welding consumable(s) (e.g., **manufacturer** ,

distributor and/or supplier) can lease welding equipment to a customer and contract to
supply...part upon information included in a vendor managed replenishment contract and/or vendor equipment lease/ **supply** contract, lead **time** , usage rate forecast, welding consumable(s) in transit and/or **safety stock** requirements). If the determination at 1 1 50 is YES, at I 1 60, reordering...

16/3,K/14 (Item 12 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00943767 **Image available**
SYSTEM, METHOD AND COMPUTER PROGRAM PRODUCT FOR A SUPPLY CHAIN MANAGEMENT
SYSTEME, PROCEDE ET PRODUIT PROGRAMME INFORMATIQUE CONCUS POUR UNE GESTION DE CHAINE D'APPROVISIONNEMENT
Patent Applicant/Assignee:
RESTAURANT SERVICES INC, Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (For all designated states except: US)
Patent Applicant/Inventor:
HOFFMANN George Harry, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
BURK Michael James, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
MENNINGER Anthony Frank, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
GREENE Edward Arthur, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
SMITH Mark Alan, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
TOMAS-FLYNN Martha Helen, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
REECE Debra Gayle, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
SECHRIST Daniel, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
EKEY Diane Karen, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
RUEFF Mark Patrick, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
BARNETT John B, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
RODRIGUEZ Wendy, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
MARKS Stephen Patrick, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)

FOURAKER William Vance, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
HYATT James F II, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
DIAZ Adriana Maria, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
KIRSHENBAUM Laurence Joseph, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
BESSETTE Robert John, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
GEHMAN Anson Jerome, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
MOR Richardo, Restaurant Services, Inc., Two Alhambra Plaza, Suite 500, Coral Gables, FL 33134-5202, US, US (Residence), US (Nationality), (Designated only for: US)
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Legal Representative:
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Patent and Priority Information (Country, Number, Date):
Patent: WO 200277917 A1 20021003 (WO 0277917)
Application: WO 2002US8287 20020319 (PCT/WO US02008287)
Priority Application: US 2001816567 20010322; US 2001815598 20010323; US 2001816565 20010323; US 2001816488 20010323; US 2001816426 20010323; US 2001815899 20010323; US 2001816507 20010323; US 2001816422 20010323; US 2001816269 20010323; US 2001816491 20010323; US 2001816101 20010323; US 2001816231 20010323; US 2001816421 20010323; US 2001816069 20010323; US 2001816296 20010323; US 2001816249 20010323; US 2001816121 20010323; US 2001815668 20010323; US 2001816187 20010323; US 2001815490 20010323; US 2001816471 20010323; US 2001815606 20010323; US 2001815777 20010323; US 2001815813 20010323; US 2001816429 20010323; US 2001815515 20010323; US 2001816543 20010323; US 2001816349 20010323; US 2001816331 20010323; US 2001816167 20010323; US 2001816881 20010323; US 2001816536 20010323; US 2001816092 20010323; US 2001816576 20010323; US 2001815759 20010323; US 2001816495 20010323; US 2001816976 20010323; US 2001816083 20010323; US 2001815715 20010323; US 2001815989 20010323; US 2001816561 20010323; US 2001815483 20010323; US 2001816553 20010323; US 2001815688 20010323; US 2001816388 20010323; US 2001816358 20010323; US 2001815729 20010323; US 2001816537 20010323; US 2001816434 20010323; US 2001815897 20010323; US 2001815734 20010323; US 2001816431 20010323; US 2001816021 20010323; US 2001816454 20010323; US 2001816413 20010323; US 2001816430 20010323; US 2001816428 20010323; US 2001815830 20010323; US 2001816922 20010323; US 2001815489 20010323; US 2001816048 20010323; US 2001815727 20010323; US 2001816212 20010323; US 2001815660 20010323; US 2001815894 20010323; US 2001816151 20010323; US 2001816582 20010323; US 2001816033 20010323; US 2001816357 20010323; US 2001816420 20010323; US 2001815731 20010323; US 2001816503 20010323; US 2001816160 20010323; US 2001815893 20010323; US 2001816414 20010323; US 2001815792 20010323; US 2001815864 20010323; US 2001816896 20010323; US 2001815725 20010323; US 2001816285 20010323; US 2001815973 20010323; US 2001815845 20010323; US 2001816314 20010323; US 2001816075 20010323; US 2001816944 20010323; US 2001815559 20010323; US 2001816203 20010323; US 2001816567 20010323; US 2001816268 20010323; US 2001816424 20010323; US 2001816564 20010323; US 2001816455 20010323; US

2001816412 20010323; US 2001815590 20010323; US 2001816555 20010323; US 2001816560 20010323; US 2001816427 20010323; US 2001834600 20010413; US 2001834838 20010413; US 2001834924 20010413; US 2001834465 20010413

Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM

Publication Language: English
Filing Language: English
Fulltext Word Count: 114107

...International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description
Detailed Description
... of the present invention;
Figure 23 is a flowchart of a process for raw product **supply** chain reporting in accordance
1 5 with an embodiment of the present invention;
Figure 24...and provide leadership in the evolution of retailer systems to ensure electronic connectivity to the **Supply** Chain. This component enables electronic data collection of daily ...of the supply chain includes sales of goods. In another embodiment, the aspect of the **supply** chain includes a demand of raw products required to produce the goods.

Overall Business Analysis...or standard (or ideal) gross margin, and comparable information from participating retailers on this information.

Supply chain providers benefit by having access "real- **time** " sales information. This drives efficiencies in two ways: 1) Management of promotional volumes and **inventories** , and 2) Management of on going **production** planning. Regarding promotional volumes and **inventories** , **supply** chain providers are permitted to react faster by having sales information up to many weeks earlier than currently available. With respect to **production** planning, by having "real- **time** " sales information, suppliers are able to maintain lower **safety** **stocks** , improving capital efficiency.

1 5 Many of the benefits from "Integrated **Supply** Chain Management" are derived from the ability to deliver useful information for planning and operational...

16/3,K/15 (Item 13 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00903235 **Image available**
SYSTEM AND METHOD FOR OPTIMIZING RESOURCE PLANS
SYSTEME ET PROCEDE D'OPTIMISATION DE PLANS DE RESSOURCES
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Legal Representative:
CROWSON Celine Jimenez (et al) (agent), Hogan & Hartson, LLP, 555 Thirteenth Street, N.W., Washington, DC 20004-1109, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200237312 A1 20020510 (WO 0237312)
Application: WO 2001US42822 20011029 (PCT/WO US0142822)
Priority Application: US 2000243426 20001027
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ
EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR
LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI
SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 19167

Main International Patent Class: **G06F-017/00**
Fulltext Availability:
Detailed Description

Detailed Description
... with @customer
service and on time delivery of customer orders. It may include information regarding **demand** (e.g., **total** customer **demand** , non-consumed forecast, late demand), customer orders (e.g., sales revenues, delivery performance, and average...

...SKU projections such as inventory value (e.g., average, minimum, and maximum inventory value, variation), **demand**

coverage (e.g., average, minimum, and maximum **demand** coverage), problems (e.g., periods with negative projective inventory balances or under
safety **stock**), and causes of lateness. The resource performance 333 (or
resource utilization performance) may be based...

16/3,K/16 (Item 14 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00901355 **Image available**
SYSTEM AND METHOD FOR ENSURING ORDER FULFILLMENT
SYSTEME ET PROCEDE GARANTISSANT L'EXECUTION D'UNE COMMANDE
Patent Applicant/Assignee:

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Patent and Priority Information (Country, Number, Date):

Patent: WO 200235437 A1 20020502 (WO 0235437)
Application: WO 2001US42797 20011029 (PCT/WO US0142797)
Priority Application: US 2000243427 20001027

Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)

AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM

Publication Language: English
Filing Language: English
Fulltext Word Count: 27013

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... is greater.

The user may also choose to use duration forward coverage for adjusted independent **demand** , **total** forward coverage, or **total** forward coverage plus statistical
I I
safety **stock** for independent demand. These three rules calculate the number of units of demand within the forward coverage duration, either adjusted independent **demand** or **total** **demand** .

The system can use either a single safety stock forward coverage duration over the entire...of zero both for the base forward coverage and the incremental forward coverage.

Using either **total** **demand** or adjusted **demand** , the system **totals** the units of **demand** within the forward coverage duration; this number may be used as the **safety** **stock** as of this number and may be added to the calculated statistical **safety** **stock** value.

When the user selects to use a statistical safety stock, the planning component 21...minimum shelf life requirements for the same item, and these values also can vary over **time** , each planned shipment must be considered individually. The first replenishment date is the earlier of the first replenishment needed to meet distribution **demand** , and the first replenishment needed to meet any other requirement (including

safety stock).
The coverage cycle begins at the first replenishment date. The coverage cycle may be violated by distribution requirements, since inventory created for a given coverage **period** may not be fresh enough for a distribution requirement late in that coverage period. For...same priority for Equation 4.

demand at Loc(n) at time(t)
x remaining stock
total demand at all Locs(1 ... n) at time(t)
(Equation 4)
The planning component 21 0...

...the destination and the source has the same location priority as its destinations. When allocating **safety stock** , the planning component 21 0 includes the source location in the fairshare allocation if there is **safety stock** demand at the source. Location priority is not considered when allocating **safety stock** .

When **stock** is limited, the planning component 210 does not wait for enough stock to recommend a...recommended shipments, it aggregates them. For recommended shipments generated to meet firm planned arrivals and **safety stock** , the planning component 210 aggregates shipments to prevent duplicate rows. For recommended shipments generated to meet other **demand** , the planning component 210 **aggregates** shipments with the same item, source, destination, and scheduled shipment date. These dates have already...from firm planned arrivals, firm planned orders, or scheduled receipts. The CMP also may reallocate **supply** by **time period** in order to make the **supply** planning component 210 more just-in- **time** (i.e., not **supply** SKUs too early). The CMP then allocates **supply** to cover **safety stock** .

The CNT works one **period** at a **time** , for each pass, the CMP determines whether the **demand** can be met from existing **supplies** , including firm planned orders and firm planned arrivals. If additional supply is needed and the...

16/3,K/17 (Item 15 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00901327 **Image available**
SYSTEM AND METHOD FOR INVENTORY AND CAPACITY AVAILABILITY MANAGEMENT
SYSTEME ET PROCEDE POUR GERER LA DISPONIBILITE DE STOCK ET DE CAPACITE
Patent Applicant/Assignee:
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Legal Representative:
CROWSON Celine Jimenez (et al) (agent), Hogan & Hartson, LLP, 555 13th Street, N.W., Washington, DC 20004-1109, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200235394 A1 20020502 (WO 0235394)
Application: WO 2001US42801 20011029 (PCT/WO US0142801)

Priority Application: US 2000243400 20001027
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ
EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR
LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI
SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 8646

Main International Patent Class: **G06F-017/30**
Fulltext Availability:
Detailed Description

Detailed Description
... Once allocations are committed, consumption against them can be tracked at all levels in the **supply** chain, thus providing the necessary visibility to proactively manage an intricate trading network. The present invention satisfies the need for global, item-level visibility of the **inventory** resources throughout an entire **supply** chain so as to'identify and provide for **inventory** constraints and reduce failures to deliver on **time** . Companies in various industries, such as retail, high-tech, consumer packaged goods, etc., need a...

16/3,K/18 (Item 16 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00896446
SYSTEM AND METHOD FOR DETERMINING THE OPTIMUM CONFIGURATION STRATEGY FOR SYSTEMS WITH MULTIPLE DECISION OPTIONS
SYSTEME ET PROCEDE POUR DETERMINER UNE STRATEGIE DE CONFIGURATION OPTIMALE POUR DES SYSTEMES COMPORTANT DES OPTIONS DE DECISION MULTIPLES
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Patent and Priority Information (Country, Number, Date):
Patent: WO 200229608 A2 20020411 (WO 0229608)
Application: WO 2001US31223 20011005 (PCT/WO US0131223)
Priority Application: US 2000238124 20001006
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ

EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM

Publication Language: English
Filing Language: English
Fulltext Word Count: 57747

Main International Patent Class: **G06F-017/00**
Fulltext Availability:
Detailed Description
Claims

Detailed Description
... minimum UMC Heuristic.

[0046] Fig. 10 is the schematic depiction of Fig. 8 showing the **production** times for minimum LTMC Heuristic;
[00471 Fig. 1 1 is the schematic depiction of Fig. 8 showing the optimal **safety - stock** placement for the minimum UMC Heuristic;
[0048] Fig. 12 is the schematic depiction of Fig. 8 showing the optimal service times for the minimum **production time** Heuristic;
[00491 Fig. 13 is the schematic depiction of Fig. 8 showing the **production** times for the minimum **production time** Heuristic;
[0050] Fig. 14 is the schematic depiction of Fig. 8 showing the optimal 1 0 **safety - stock** placement policy for minimum **production time** Heuristic;
[00511 Fig. ...chain design framework of the present invention considers specific costs that are relevant when designing **supply** chains. The specific costs that are considered include unit **manufacturing** costs, inventory cost, and **time** -to-market costs. Inventory costs include **safety - stock** cost and pipeline stock cost. The present invention minimizes the sum of these costs when creating a **supply** chain.

[0079] The problem is a design problem because there are several 1 0 available...supply chain, the first embodiment therefore presents a method to minimize at least one of **manufacturing** costs, inventory costs, and **time** -to-market costs for an N-stage serial **supply** chain. The inventory costs may include both **safety - stock** cost and pipeline stock cost. Therefore, the method may minimize the sum of at least one of **manufacturing** costs, safetystock costs, pipeline stock costs, and **time** -to-market costs.

[00851 Figure 1 shows a schematic of a plurality of interconnected stages...Ti - Si) [tj (3)
for Si-1 + Ti - Si > 0. The expected inventory represents the **safety - stock** held at stage i. The **safety - stock** is a function of the net replenishment **time** and the bound on the **demand** process.

[001231 1 4 Pipeline Inventory
[001241 In addition to the **safety - stock** , the present invention accounts
for the in-process or pipeline stock at the stage. Following...

...argument for the development for Equation (1), it is observed that the work-in-process
inventory at **time** t is given by

Wi(t) = di(t - Si-1 - Ti, t - Si-1) .

That is, the work-in-process corresponds to Ti **periods** of **demand** given the assumption of a deterministic production lead- **time** for the stage. The amount
5 of inventory on order at **time** t is
Oi(t) = di(t - Si-1, t)
where the units of Oi(t...Option Objective Function Determination
100136] The fonnulation of total costs that are relevant to a **supply** chain configuration problem will now be developed. In a **supply** chain, there are at least four relevant costs that are considered during the optimization of the **supply** chain: **manufacturing** cost, **safety - stock** cost, pipeline stock cost, and **time** -to-market costs. **Safety - stock** cost and pipeline stock cost, which constitute **inventory** costs, have already been introduced and only need to be modified to handle the addition of multiple options at a stage. The **manufacturing** cost is equal to the total direct cost of all the units of product that are shipped to consumers. The **time** -to-market cost is a function of the configuration's longest path.

[001371 It will...the figure, a circle 14 denotes a processing operation and a
triangle 12 denotes a **safety - stock** location. **Safety - stock** is held at both of the **demand** stages. Since both of these stages must quote a service **time** of zero, they have to stock **inventory** . The **demand** stages are both quoted a service **time** of 31 days. Given these service times, none of the subassemblies have to hold **safety - stock** in a completed form. In fact, the **safety - stock** policies of the subassemblies can best be described as policies that minimize their individual
portions of the **supply** chain given that they can each quote an outgoing service **time** of 20 days (recall that if they quoted more than 20 days, the net replenishment **time** of downstream stages like Digital Capture Assembly WO 02/29608 PCT/USOI/31223
80
time...accurate
representation of the company's implemented supply chain. The savings generated by optimizing the **safety - stock** levels without changing the supply chain's configuration equals $59,292 (this optimized case is...

...the Min
UMC heuristic presented in Section [00327]). The savings generated by jointly optimizing the **safety - stock** levels and the **supply** chain's configuration **total** $194,289. Therefore, jointly optimizing both the configuration and the
safety - stock placement will save three times as much as leaving the configuration unchanged and only optimizing the **safety - stock** placement.
1 5 [003471 Also, it is important to note that implementing the optimal policy...is not limited to, safety stock level, contribution to Cost of Goods
Sold (COGS), initial **inventory** investment, service **time** , purchase cost,
replenishment lead **time** , net replenishment lead **time** , pipeline stock cost, **production** unit cost, weighted unit cost, mean **demand** , standard deviation in **demand** , and coefficient of variation in **demand** . Figure 23 shows an example of expanded stage displays for **safety stock** level, contribution to Cost of Goods Sold (COGS), and initial **inventory** investment.

I 0
1004221 6 5 Stage Editing and Reporting
[004231 A system and method...that may include a number of cost metrics associated with a stage such as a **total supply** chain cost which may represent the total inventory cost and product cost throughout the chain...

...horizon, a total pipeline stock cost throughout the chain over the time horizon, a total **safety stock** cost throughout 1 0 the chain over the time horizon, a total inventory investment cost...

...a cost of goods sold value for the cost of final products sold over the **time** horizon.

[004331 Figure 32 shows an inventory metrics tracking report 820 that may include a number of inventory metrics associated with a stage such as inventory turns, total **safety stock** days of **supply** , **total** pipeline stock days of **supply** , and a **total** stock days of **supply** which may represent the number of **periods** of demand worth of **inventory** stored throughout the **supply** chain.

Furthermore, in one embodiment the computer system 200 configured according to the present invention...

Claim
... of demand is based on a forecast.

99 The apparatus of claim 96, wherein said **safety - stock** cost at each stage is the product of an expected **safety - stock** cost at each stage, a holding cost rate, and a cumulative cost, said cumulative cost ...

...stage associated with a corresponding option.
100. The apparatus of claim 99, wherein said expected **safety - stock** at each stage is a maximum **demand** at each stage over an interval of **time** minus an average **demand** over said interval of **time** .
101. The apparatus of claim 95, said **inventory** costs include a pipeline stock cost for each stage, the pipeline stock cost being a...of claim 115, wherein said summation of quantifiable characteristics includes at least one of a **manufacturing** cost, **inventory** cost, and **time** -to-market cost.
117. The apparatus of claim 79, wherein said at least one data cost is an amount of **time** associated with performing said operation.
140. The method of claim 139, wherein said total cost includes at least one of a **manufacturing** cost, an **inventory** cost, and a **time** -to-market cost.
141. The method of claim 140, further comprising:
displaying, via the user...

...wherein a portion of said optimum series of options includes at least one of a **total** of said **manufacturing** cost, said **inventory** cost, and said **time** -to-market cost for a user selected stage of the system.
143. The method of...

...displaying including at least a tabular format.
151. Themethodofclaiml5O,fartherincluding:
displaying, upon user request, an **inventory** by cause report showing for each said **inventory** level detailed analysis information, said detailed analysis information including at least one of batching, early arrivals, **demand** uncertainty, and stage **time** uncertainty, said displaying including at least a tabular format.
152. The method of claim 120...

...of claim 156, wherein said summation of quantifiable characteristics includes at least one of a **manufacturing** cost, **inventory** cost, and **time** -to-market cost.
158. Themethodofclaiml18,whereinsaidstagesymbolincludeat least one of a first shape and a second...monetary amount associated with performing said operation; and said second cost is an amount of **time** associated with perforining said operation.
187. The computer-readable medium of claim 186, wherein said total cost includes at least one of a **manufacturing** cost, an **inventory** cost, and a **time** -to-market cost.
188. The computer-readable medium of claim 187, ffirther comprising:
displaying, via...198. The computer-readable medium of claim 197, further including:
displaying, upon user request, an **inventory** by cause report showing for each said **inventory** level detailed analysis infon-nation including at least one of batching, early arrivals, **demand** uncertainty, and stage **time** uncertainty, said displaying including at least a tabular forniat.
199. The computer-readable medium of...

...of claim 203, wherein said summation of quantifiable characteristics includes at least one of a **manufacturing** cost, **inventory** cost, and **time** -to-market cost.
205. The computer-readable medium of claim 165, wherein said stage symbol...amount associated with perfon-ning said operation; and said second cost is an amount of **time** associated with performing said operation.
234. The apparatus of claim 233, wherein said total cost includes at least one of a **manufacturing** cost, an **inventory** cost, and a **time** -to-market cost.
235. The apparatus of claim 234, wherein the processor is further configured...

...wherein a portion of said optimum series of options includes at least one of a **total** of said **manufacturing** cost, said **inventory** cost, and said **time** -to-market cost for a user selected stage of the system.
237. The apparatus of...

...of claim 244, wherein the processor is ffirther configured to:
display, upon user request, an **inventory** by cause report showing for each said **inventory** level detailed analysis information, said detailed analysis
information including at least one of batching, early arrivals, **demand** uncertainty, and stage **time** uncertainty, said display including at least a tabular fortnat.
246. The apparatus of claim 214...

16/3,K/19 (Item 17 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00865421 **Image available**
METHOD AND SYSTEM FOR SUPPLIER RELATIONSHIP MANAGEMENT
PROCEDE ET SYSTEME DE GESTION DES RELATIONS FOURNISSEURS
Patent Applicant/Assignee:
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Legal Representative:
MARCOU George T (agent), Kilpatrick Stockton LLP, Suite 900, 607 Thirteenth Street, N.W., Washington, DC 20005, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200199018 A1 20011227 (WO 0199018)
Application: WO 2001US20011 20010622 (PCT/WO US0120011)
Priority Application: US 2000213324 20000622; US 2000250507 20001204
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 21711

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... e. .

g,
units/month), standard order quantity, and standard shipping quantity. From this "Inventory Surnmary," **manufacturer** personnel are able to determine what products and/or services they are going to need and at what **time** these products and/or services will need to be delivered. **Inventory** visibility enables **manufacturers** to implement supplier managed or consigned 1 0 **inventory** programs while providing the supplier with infonnation about the quantity and location of **inventory** in storage at a . **manufacturer** 's facilities. The **inventory** visibility feature provides the supplier with the data required to maintain **safety stock** quantities, forecast and plan **production** , quickly respond to pull triggers, and determine the appropriate **time** to invoice for consumed goods. Each plant/facility will provide **inventory** quantity and location information through the SRMS so that suppliers will be able to track...

16/3,K/20 (Item 18 from file: 349)

00860469
METHOD AND SYSTEM FOR DETERMINING DEMAND AND OUTPUT VARIABILITY ANALYSIS
PROCEDE ET SYSTEME PERMETTANT DE DETERMINER UNE ANALYSE DE VARIABILITE DE DEMANDES ET DE SORTIES
Patent Applicant/Assignee:
GENERAL ELECTRIC COMPANY, 1 River Road, Schenectady, NY 12345, US, US (Residence), US (Nationality)
Inventor(s):
SLOCUM Gregory Howard, 4517 Goodfellow Drive, Dallas, TX 75229, US,
MCKENZIE Mark, 2 Timber Trace, Ballston Spa, NY 12020, US,
Legal Representative:
SNYDER Bernard (et al) (agent), General Electric Company, 3135 Easton Turnpike W3C, Fairfield, CT 06431, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200193151 A2 20011206 (WO 0193151)
Application: WO 2001US13134 20010424 (PCT/WO US0113134)
Priority Application: US 2000207372 20000526; US 2000620604 20000720
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 9663

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... transmits the final production schedule to Production site 60.

Production site 60 oversees the actual **manufacture** of the MTO/MTS produets. The finished products are stored at Inventory site 62. Inventory site 62 monitors existing stock quantities for all products so that **safety stock** quantities are maintained to meet existing and. forecasted **demand** . **Inventory** site 62 reviews the informafion transmitted by Purchasing System site 58 and. MPS site 56 to assure the finislied products from **Production** site 60 meet the customer's specifications. At that **time** **Inventory** site 62 forwards the finished products to an Orders-Ship-Bill site 64 (hereinafier referred...analyze the demand trend and predict new potential output or minimum orders quantities using historical **demand** , data. The **manufacturing** entity can in tum suggest to the customer a potential minimura order quantity to meet apparent **demand** fluctuations and maintain a **safety stock** . As a result, the company can reduce carrying costs associated with maintaining an **inventory** surplus. At the same **time** the analysis can examine the **demand** trends to detennine which are more or less stable so aecurate lead-times can be...

...determine an appropriate course of action. The obstacle can be avoided -25~ prior to expending **time** , energy, and labor for **manufacturing** , or consuming existing inventory and. endangering **safety stock** levels.

Another recognized advantage of the method and. systein disclosed herein involves inventory planning. Carrying...

16/3,K/21 (Item 19 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00860451
METHOD AND SYSTEM FOR CAPTURE AND ANALYSIS OF PRODUCT DELIVERY DATE
PROCEDE ET SYSTEME DE CAPTURE ET D'ANALYSE DE LA DATE DE LIVRAISON DE PRODUITS
Patent Applicant/Assignee:
GENERAL ELECTRIC COMPANY, 1 River Road, Schenectady, NY 12345, US, US (Residence), US (Nationality)
Inventor(s):
DANKER Cheryl, 12 Van Voast Lane, Scotia, NY 12302, US,
LEBUIS Brian R, 840 Kings Road, Schenectady, NY 12303, US,
MEYER Stephen, 277 Hudson Avenue, Albany, NY 12210-1801, US,
MURPHY Jude T, 732 County Route 7, East Shodack, NY 12063, US,
Legal Representative:
SNYDER Bernard (et al) (agent), General Electric Company, 3135 Easton Turnpike W3C, Fairfield, CT 06431, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200193085 A2 20011206 (WO 0193085)
Application: WO 2001US9693 20010326 (PCT/WO US0109693)
Priority Application: US 2000207250 20000526; US 2000634175 20000809
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE
ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT
LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM
TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 10648

Main International Patent Class: **G06F-017/00**
Fulltext Availability:
Detailed Description

Detailed Description
... 56 transmits the final production schedule to Production Site Production site 60 oversees the actual **manufacture** of the MTO/MTS products. The finished products are stored at Inventory site 62. Inventory site 62 monitors existing stock quantities for all products so that **safety stock** quantities are maintained to meet existing and forecasted **demand** . **Inventory** site 62 reviews the infonnation transmitted by Purchasing System site 58 and MPS site 56 to assure the finished produets from **Production** site 60 rneet the custorner's

specifications. At that **time** **Inventory** site 62 forwards the finished products to an Orders-Ship-Bill site 64 (hereinafter referred...and determine an appropriate course of action. The obstacles can be avoided prior to expending **time** , energy, and labor for **manufacturing** , or consuming existing inventory and endangering **safety** **stock** levels.

Another recognized advantage of the method and system disclosed hercin involves inventory planning. Carrying...

16/3,K/22 (Item 20 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00860448
METHOD AND SYSTEM FOR CLASSIFYING PRODUCT MANUFACTURING TYPE
METHODE ET SYSTEME DE CLASSEMENT DE TYPE DE FABRICATION DE PRODUIT
Patent Applicant/Assignee:
GENERAL ELECTRIC COMPANY, 1 River Road, Schenectady, NY 12345, US, US (Residence), US (Nationality)
Inventor(s):
SLOCUM Gregory Howard, 1241 Ruffner Road, Niskayuna, NY 12309, US,
THAM Amanda, 26205 Seville Drive, Apartment 201, Beachwood, OH 44122, US,

Legal Representative:
SNYDER Bernard (et al) (agent), General Electric Company, 3135 Easton Turnpike-W3C, Fairfield, CT 06431, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200193073 A2 20011206 (WO 0193073)
Application: WO 2001US13154 20010424 (PCT/WO US0113154)
Priority Application: US 2000207252 20000526; US 2000620386 20000720
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE
ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT
LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM
TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 9488

Main International Patent Class: **G06F-017/00**
Fulltext Availability:
Detailed Description

Detailed Description
... transmits the final production schedule to Production site 52.

Production site 60 oversees the actual **manufacture** of the MTO/MTS products. The finished products are stored at Inventory site 62. Inventory site 62 monitors existing stock quantities for all produets so that **safety** **stock** quantities are maintained.to meet existing and forecasted **demand** . **Inventory** site 62 reviews the information transmitted by Purchasing System site 58 and MPS site 56 to assure the finished products from **Production** site 60 ineet the eustonier's

specifications. At that **time** **Inventory** site 62 forwards the finished products to an Orders-Ship-Bill site 64 (hereinafter referred...and determine an appropriate course of action. The obstacle can be avoided prior to expending **time** , energy, and labor for **manufacturing** , or consuming existing inventory and endangering **safety** **stock** levels.

Another recognized advantage of the method and system disclosed herein - involves inventory planning. Carrying...

16/3,K/23 (Item 21 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00859455 **Image available**
METHOD AND SYSTEM FOR MANAGING MANUFACTURING
PROCEDE ET SYSTEME DE GESTION DE LA PRODUCTION
Patent Applicant/Assignee:
GENERAL ELETRIC COMPANY, 1 River Road, Schenectady, NY 12345, US, US (Residence), US (Nationality)
Inventor(s):
SLOCUM Gregory Howard, 4517 Goodfellow Drive, Dallas, TX 75229, US,
KRICHILSKY Philip, 9208 Crofton Springs Drive, Charlotte, NC 12866, US,
GARNSEY Gil, 20 Holloway Lane, Averill Park, NY 12018, US,
Legal Representative:
SNYDER Bernard (et al) (agent), General Electric Company, 3135 Easton Turnpike W3C, Fairfield, CT 06431, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200193086 A2 20011206 (WO 0193086)
Application: WO 2001US9695 20010326 (PCT/WO US0109695)
Priority Application: US 2000207256 20000526; US 2000620605 20000720
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 9706

Main International Patent Class: **G06F-017/00**
Fulltext Availability:
Detailed Description

Detailed Description
... transmits the final production schedule to Production site 52.

Production site 60 oversees the actual **manufacture** of the MTO/MTS products. The finished products are stored at Inventory site 62. Inventory site 62 monitors existing stock quantities for all products so that: **safety** **stock** quantities are mailitained to meet existing and forecasted **demand** . **Inventory** site 62 reviews the information transmitted by Purchasing System site 58 and MPS site 56 to assure the finished products from. **Production** site 60 meet the customer's

specifications. At that **time** **Inventory** site 62 forwards the finished products to an Orders-Ship-Bill site 64 (hereinafter referred...and determine an appropriate course of action. The obstacles can be avoided prior to expending **time** , energy, and labor for **manufacturing** , or consuming existing inventory and. endangering **safety** **stock** levels.

Another recognized advantage of the method and. system disclosed herein involves inventory planning. Carrying...

16/3,K/24 (Item 22 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00847374 **Image available**
METHOD AND SYSTEM FOR MULTI-ENTERPRISE OPTIMIZATION USING FLEXIBLE TRADE CONTRACTS
PROCEDE ET SYSTEME D'OPTIMISATION MULTI-ENTREPRISES UTILISANT DES CONTRATS COMMERCIAUX FLEXIBLES
Patent Applicant/Assignee:
i2 TECHNOLOGIES INC, 11701 Luna Road, Dallas, TX 74234, US, US (Residence), US (Nationality)
Inventor(s):
DALAL Mukesh, 2508 Timber Ridge Lane, Flower Mound, TX 75028, US,
DALAL Leenam, 2508 Timber Ridge Lane, Flower Mound, TX 75028, US,
Legal Representative:
KENNERLY Christopher W (agent), Baker Botts L.L.P., 2001 Ross Avenue, Dallas, TX 75201-2980, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200179960 A2-A3 20011025 (WO 0179960)
Application: WO 2001US10782 20010402 (PCT/WO US0110782)
Priority Application: US 2000548466 20000413
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT (utility model) AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ (utility model) CZ DE (utility model) DE DK (utility model) DK DM DZ EE (utility model) EE ES FI (utility model) FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK (utility model) SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 11680

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... multi-enterprise supply chain activity in a different way. For example, forward contracts may reduce **time** -based safety stocks by transforming relatively expensive make-to-stock environments into efficient made-to-order environments.

Option contracts may reduce quantity-based **safety stocks** by effectively transferring some **inventory** to the sellers.

Flexible forward contracts may transform make~to-stock environments into configure-to-order environments by aggregating **demand** and **supply** variability. The use of different types of flexible trade contracts helps provide a balance of...

16/3,K/25 (Item 23 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00799905 **Image available**
STANDARD PARTS METERING SYSTEM
SYSTEME DE COMPTAGE DE PIECES NORMALISEES
Patent Applicant/Assignee:
K & T OF LORAIN LTD, 33684 Walker Road, Avon Lake, OH 44012, US, US (Residence), US (Nationality), (For all designated states except: US)
Patent Applicant/Inventor:
PENDELL Greg, 5477 Pine Bluff Road, Columbus, OH 43229, US, US (Residence), US (Nationality)
Legal Representative:
SCOTT James C (agent), Arter & Hadden LLP, 1100 Huntington Building, 925 Euclid Avenue, Cleveland, OH 44115, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200133483 A1 20010510 (WO 0133483)
Application: WO 2000US29960 20001031 (PCT/WO US0029960)
Priority Application: US 99163006 19991101
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Filing Language: English
Fulltext Word Count: 7263

Main International Patent Class: **G06F-019/00**
International Patent Class: **G06F-007/00**
Fulltext Availability:
Detailed Description

Detailed Description
... taken (change
in system quantities or corrective processes for misuse);
improvement of efficiency within a **manufacturing** plant by.

level material flow to the plant (reduced **inventory** carrying costs);
transportation budget efficiencies (particularly expedite costs);
time window deliveries;
sequenced linefeed deliveries;
immediate replenishment under exception fulfillment requirements (near elimination of stock...exception manage LTD (load to delivery);
arrive Standard Parts into WMS (warehouse management system);
maximize **inventory** levels based on WMS data;

pick and pack according to **production** drop zone specifications;
sequence load shuttle deliveries;
follow lead logistics provider requirements for **time** window deliveries opportunities;
become information partners with lead logistics provider;
immediately identify and notify parts...

16/3,K/26 (Item 24 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00787795 **Image available**
BINARY TREES FOR DETECTING INVENTORY PROBLEMS IN AN ENTERPRISE MODEL
ARBORESCENCES BINAIRES PERMETTANT DE DETECTER DES PROBLEMES DE STOCK DANS UN MODELE D'ENTREPRISE
Patent Applicant/Assignee:
i2 TECHNOLOGIES INC, 11701 Luna Road, Dallas, TX 75234, US, US (Residence), US (Nationality)
Inventor(s):
CLINE Kevin A, Apartment 1435, 5665 Arapaho Road, Dallas, TX 75248, US,
Legal Representative:
KENNERLY Christopher W (agent), Baker Botts L.L.P., 2001 Ross Avenue, Dallas, TX 75201-2980, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200120480 A2-A3 20010322 (WO 0120480)
Application: WO 2000US24206 20000831 (PCT/WO US0024206)
Priority Application: US 99397818 19990917
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AG AL AM AT AT (utility model) AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ CZ (utility model) DE DE (utility model) DK DK (utility model) DM DZ EE EE (utility model) ES FI FI (utility model) GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KR (utility model) KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SK (utility model) SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 8157

Main International Patent Class: **G06F-017/30**
International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... may be defined as the maximum of the minimum-on-hand quantity and the min- **time** safety stock. A low-on-hand problem can be reported whenever the on-hand quantity falls below the **safety stock** quantity. This requires separately detecting minimum-on-hand violation and min- **time** violations, then combining adjacent violations to **produce** the low-on-hand times.

Maximum-on-hand quantity can be defined as the sum...

16/3,K/27 (Item 25 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00748802 **Image available**
SYSTEM AND METHOD FOR INTERACTIVELY MANAGING TRANSPORTATION OF CARGO AND DATA ASSOCIATED THEREWITH
SYSTEME ET PROCEDE PERMETTANT DE GERER DE MANIERE INTERACTIVE LE TRANSPORT DE MARCHANDISES ET DONNEES CORRESPONDANTES
Patent Applicant/Assignee:
OPTIMUM LOGISTICS LTD, 2001 W. Main Street, Suite 205, Stamford, CT 06902, US, US (Residence), US (Nationality)
Inventor(s):
BLOOM Kenneth Bruce, 2001 W. Main Street, Suite 205, Stamford, CT 06902, US
HUANG Melody W, 2001 W. Main Street, Suite 205, Stamford, CT 06902, US
Legal Representative:
BUSH Gary L, Mayor, Day, Caldwell & Keeton, L.L.P., Suite 1900, 700 Louisiana, Houston, TX 77002-2778, US
Patent and Priority Information (Country, Number, Date):
Patent: WO 200062227 A1 20001019 (WO 0062227)
Application: WO 2000US9421 20000407 (PCT/WO US0009421)
Priority Application: US 99289501 19990409
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM
HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX
NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 12004

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Claims

Claim
... What is the combination of mode, frequency, parcel size, rc storage tanks that minimizes the **total supply** chain cost for level of customer service?
Fig. 12
UOSO m Far East Supply Chain...2551-6000 $101 3751-7 00 $101
Other Data Not Shown Here
Tank Container Storage
Safety Stock Requirements
Ullage
Parcel Sizes In/Out
Shipment Frequency
Variation in Parcel Sizes
Variation in Frequency...

...is
400 2!% 350

cn
300
14W
250
0% -10% -20% -30% -40%
Change in **Total** **Demand** from Current Plan
Stolt Optimization System IM
Fig. 21
Business Partner Integration
Freight
Forwarder
Stolt...

...Capture Toll Tables Fig. 22
q Data Entry Direct to MIMI Product Values
MIMI Database **Demand**
AS4 own oa upply
Safety **Stock**
Minimum **Stock**
Sets Demurrage
Master Freight Rates for all Modes
Products Rules To Between All Locations
Locations Build Tables Master Storage Cost Structures and
Time Tank Capacities for Individual
Source Storage Tanks in all Locations
Receive Tank Container Storage Costs...

...a Mode
STINC-Storage Tank Capacities
MNINC-Minimum Throughput
EXINC-Excess Throughput
IVINC-Inventory
SSINC- **Safety** **Stocks**
i
ROWS and COL: Definition of the Rows and Columns
of the Matrix
ROWS and...

16/3,K/28 (Item 26 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00745517 **Image available**
METHOD AND SYSTEM FOR DETERMINING TIME-PHASED SALES FORECASTS AND PROJECTED REPLENISHMENT SHIPMENTS IN A SUPPLY CHAIN
PROCEDE ET SYSTEME DETERMINANT LES PREVISIONS DE VENTES FRACTIONNEES ET LES COMMANDES DE REAPPROVISIONNEMENT PLANNIFIEES D'UNE CHAINE D'APPROVISIONNEMENT
Patent Applicant/Assignee:
THE RETAIL PIPELINE INTEGRATION GROUP INC, 85 Allen Martin Drive, Essex Junction, VT 05452, US, US (Residence), US (Nationality)
Inventor(s):
LANDVATER Darryl V, 121 Chapman Lane, Williston, VT 05495, US,
Patent Applicant/Inventor:
LANDVATER Darryl V, 121 Chapman Lane, Williston, VT 05495, US, US (Residence), -- (Nationality), (Designated only for: US)
Legal Representative:
MEIER Lawrence H (agent), Downs Rachlin & Martin PLLC, 199 Main Street, P.O. Box 190, Burlington, VT 05402-0190, US,

Patent and Priority Information (Country, Number, Date):
Patent: WO 200058891 A1 20001005 (WO 0058891)
Application: WO 2000US7805 20000325 (PCT/WO US0007805)
Priority Application: US 99126454 19990326
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 19284

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description
Claims

Detailed Description
... from going out of stock when demands occur which are greater than the forecast. Safety **time** is a better way to deal with demands that vary greatly (such as promotions), since it has the effect of adjusting the **safety stock** level automatically. However, **safety stock** levels are better suited to the normal non-promotional **demand** at a retail store because the **safety stock** is based on the number of products needed to provide an attractive display. By providing the ability to switch the **safety stock** policy and allow **safety stock** on non-promotional demands and simultaneously allow safety **time** for promotional demands. the most appropriate methods are used for each type of **demand** .

29
Next, at step 354, a check is made for override promotion safety times. The promotion safety **time** is a different safety **time** from the initial distribution safety **time** . As with the initial distribution safety time. replenishment system 200 permits users to specify
'de...

Claim
... and (iii) promotion. further wherein said replenishment system permits a user to override said safety **time** and said percentage. 16) A systern according to claim 2. wherein said replenishment system determines said first and second projected replenishment shipments as a function of **safety stock** levels for a first product **demand** outside of promotional **periods** for such product and as a function of safety **time** levels for a second product **demand** during promotional **periods** for such product. 17) A system according to claim 21, wherein said forecasting system determines said pr 'ected sales for a product during a promotional **period** for said product on a daily
Oj t,
basis using daily sales data generated during...

...claim 26. wherein said replenishment system determines said planned replenishment shipments as a function of **inventory** , order quantity rules and shelf configuration. I 3) 0) A method of determining **time**

-phased product sales forecasts and pr 'ected
Oi
replenishment shipments for a retail store **supply** chain using product sales history records generated by retail stores in the chain, the method ...amount for a product before a promotion for said
03
product to account for increased **demand** as a result of said promotion:
b) as a function of a **safety** **stock** levels for a product outside of promotional **periods** for such product and as a function of safety **time** levels for said product during promotional
periods for such product-, and
c) by determining said first replenishment shipments during said promotional period...

16/3,K/29 (Item 27 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00733746 **Image available**
METHOD FOR MAINTAINING AN INVENTORY
METHODE DE TENUE A JOUR DE STOCK
Patent Applicant/Inventor:
WINQVIST Mika, Lauttasaarentie 9 A 9, FIN-00200 Helsinki, FI, FI (Residence), FI (Nationality)
Legal Representative:
PATENT AGENCY COMPATENT LTD, Pitkansillanranta 3 B, FIN-00530 Helsinki, FI
Patent and Priority Information (Country, Number, Date):
Patent: WO 200046733 A1 20000810 (WO 0046733)
Application: WO 2000FI81 20000204 (PCT/WO FI0000081)
Priority Application: FI 99221 19990205
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB
GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA
MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA
UG US UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 10482

Main International Patent Class: **G06F-153/00**
International Patent Class: **G06F-019/00**
Fulltext Availability:
Claims

Claim
... e) demand forecast comprising evaluation of item demand or pro duction amount in a given **time** **period** in the future;
computing or reading from the memory an order quantity of an
1 5 item;
computing deviation between **demand** forecast and actual number;
computing a forecast deviation based **safety** **stock** of the item based at least on the order quantity of the item, forecast **demand** of

the item,
lead **time** of the item, and the deviation in forecast;
computing an effective **safety** **stock** comprising at least the forecast based **safety** **stock** ; and
displaying the effective **safety** **stock** .

2 A method as in claim 1, further comprising steps of:
computing lead **time** deviation between agreed delivery dates and actual delivery dates;
computing a lead **time** based safety **time** for the item based on deviation of agreed delivery dates from actual delivery dates so...SYSTEM
....
CALCULATING FORECAST
410
DEVIATIONS: MADFTBMF
CALCULATING FIRST CORRECTION
43--z@
FACTOR OF FORECAST BASED
SAFETY **STOCK** ALTERNATIVELY
IN STAGE A
44@. CALCULATING SECOND CORRECTION
FACTOR OF FORECAST BASED
SAFETY **STOCK**
....
CALCULATING ORDER QUANTITIES OF
AND **SAFETY** **STOCKS** FOR ITEMS
FIG* 4
/7
DEMAND FETS = 0
A
2500 - Actual **Demand**
2000 - Actual Average
A A
1500 / V 4
1000 - V Forecast
500
1 2 3 4 5 6 7 8 9 1 0 1 1 12
Period
DEMAND FIG* 6A FETS < 0
2500 Actual Demand
2000 '00@ /ooow@
) Actual Average
1500
1000...

16/3,K/30 (Item 28 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00730947 **Image available**
A SYSTEM, METHOD AND ARTICLE OF MANUFACTURE TO OPTIMIZE INVENTORY AND MERCHANDISING SHELF SPACE UTILIZATION
SYSTEME, PROCEDE ET ARTICLE PERMETTANT D'OPTIMISER LE CONTROLE DES STOCKS ET L'UTILISATION DES SURFACES DE PRESENTATION
Patent Applicant/Assignee:
BAV SOFTWARE INC, 700 West 20th Street, Fayetteville, AR 72701, US, US (Residence), US (Nationality)
Inventor(s):
DULANEY Earl F, 1985 Bridgeport, Fayetteville, AR 72704, US

WALLER Matthew A, 2853 Brandon Circle, Fayetteville, AR 72703, US
Legal Representative:
KEISLING Trent C, Head, Johnson & Kachigian, 228 West 17th Place, Tulsa, OK 74119, US
Patent and Priority Information (Country, Number, Date):
Patent: WO 200043934 A1 20000727 (WO 0043934)
Application: WO 2000US1913 20000125 (PCT/WO US0001913)
Priority Application: US 99117749 19990126; US 99475612 19991230
Designated States:
(Protection type is "patent" unless otherwise stated - for applications

prior to 2004)
AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 12658

Main International Patent Class: **G06F-017/60**
Fulltext Availability:
Detailed Description

Detailed Description
... value from an Ez Table
* CS Cycle Stock
m Amount of inventory required to meet **demand** during the replenishment cycle
n (ADD / 365) * (TBR / 2)
e SS **Safety Stock**
Amount of **inventory** required to account for **demand** variability during lead **time** If SDD=O then.

);--- (HCPF * Num Facings) - (ADD * TBR)
If SDD>O then.

)i@- Z...
?

```
Set     Items   Description
S1      14157   (SAFETY OR BUFFER)(2N)STOCK? ?
S2    1833414   INVENTORY OR INVENTORIES
S3    5959361   DEMAND
S4   24061209   SUPPLY OR SUPPLIES OR PRODUCE OR PRODUCTION OR MANUFACTUR?
S5   12311400   CUMULATIVE OR AGGREGAT? OR TOTAL?
S6   13061662   VALUE? ? OR QUANTITY OR QUATITIES OR AMOUNT
S7       3935   S1(S)S2
S8      79871   S5(4N)S3
S9         97   S1(S)S8
S10    329090   S5(3N)S4
S11       121   S1(S)S10
S12       129   (S9 OR S11) AND S2
S13        95   S12 NOT PY>2001
S14        76   RD (unique items)
? show file
File   9:Business & Industry(R) Jul/1994-2005/Aug 31
         (c) 2005  The Gale Group
File  15:ABI/Inform(R) 1971-2005/Sep 01
         (c) 2005 ProQuest Info&Learning
File  16:Gale Group PROMT(R) 1990-2005/Sep 01
         (c) 2005 The Gale Group
File 148:Gale Group Trade & Industry DB 1976-2005/Sep 01
         (c)2005 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2005/Sep 01
         (c) 2005 The Gale Group
File 621:Gale Group New Prod.Annou.(R) 1985-2005/Sep 01
         (c) 2005 The Gale Group
File 636:Gale Group Newsletter DB(TM) 1987-2005/Sep 01
         (c) 2005 The Gale Group
File  20:Dialog Global Reporter 1997-2005/Sep 01
         (c) 2005 Dialog
File 476:Financial Times Fulltext 1982-2005/Sep 01
         (c) 2005 Financial Times Ltd
File 610:Business Wire 1999-2005/Sep 01
         (c) 2005 Business Wire.
File 613:PR Newswire 1999-2005/Sep 01
         (c) 2005 PR Newswire Association Inc
File 624:McGraw-Hill Publications 1985-2005/Sep 01
         (c) 2005 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2005/Aug 31
         (c) 2005 San Jose Mercury News
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
```

Considered AJ 2/6/06

14/3,K/1 (Item 1 from file: 9)
DIALOG(R)File 9:Business & Industry(R)

01820916 Supplier Number: 24619801 (USE FORMAT 7 OR 9 FOR FULLTEXT)
PHILIPPINES 1998-9 PALAY RICE PRODUCTION TO BE UP 2.6%
(Philippine rice production for crop year 1998-1999 estimated at 6.654 mil metric tons, whilst rice imports estimated at 1.674 mil metric tons)
AsiaPulse News, p n/a
April 20, 1999
DOCUMENT TYPE: Custom Wire (Southern & Eastern Asia)
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 328

(USE FORMAT 7 OR 9 FOR FULLTEXT)

TEXT:
...considered the highest level of importation so far, equivalent to about 78 days of consumption.

Total **inventory** of rice **production** by July 1 is estimated at 2.458 million MT, which is equivalent to 15 days of consumption, or 25 days over the normal 90-day **buffer** **stock** level.

Peasant Rep. Leonardo Montemayor said the sharp increase in rice production can be attributed...

...CONCEPT TERMS: **Inventory** ;

14/3,K/2 (Item 2 from file: 9)
DIALOG(R)File 9:Business & Industry(R)

01460741 Supplier Number: 24145595 (USE FORMAT 7 OR 9 FOR FULLTEXT)
Service centers in '98: more of the same
(North American demand for metals expected to remain relatively stable at 1997 levels)
American Metal Market Steel Service Centers Supplement, p 4A+
January 15, 1998
DOCUMENT TYPE: Journal; Industry Overview; Geographic Profile ISSN: 0002-9998 (United States)
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1793

(USE FORMAT 7 OR 9 FOR FULLTEXT)

TEXT:
...said, "Demand is so strong, you'd work it right back down."

EMJ purposely increased **inventories** at its branches last month to avoid double handling of fast-moving items, Nelson said...

...that good demand will continue to hold stocks on hand at three months, and that **inventory** turns will increase.
"A lot of our customers are in a world market situation, so...

...improved costs from the metal supply chain. For a service center, the cost of carrying **inventory** is a big part of the cost equation. So you will see more emphasis on trying to refine your **inventory** systems to the

point where you provide customers with excellent service, have material to the customer on time, and try to reduce **safety stocks** and other factors back up the **supply** channel, to reduce **total** cost. That's certainly our strategy.," Wright said.

Reliance's Hannah noted that "as an...

...all a bit smarter now--we're all doing a better job of turning our **inventories** . We're turning a little better than five times (per year)."

The service centers are...

14/3,K/3 (Item 3 from file: 9)
DIALOG(R)File 9:Business & Industry(R)

01156463 Supplier Number: 23767889
ALCOHOL AS A FUEL LOOKS A DISTANT DREAM
(Total alcohol requirement in Uttar Pradesh, on a cumulative basis, for part replacement of fuel estimated at 76,511.11 lakh litres in 2000)
Business Standard, p 8
January 13, 1997
DOCUMENT TYPE: Business Newspaper (India)
LANGUAGE: English RECORD TYPE: Abstract

ABSTRACT:
...oxygenator. If it were to have a surplus, the state should hold 20 percent as **buffer stock** and the rest should be exported to earn foreign exchange. Following is a summary of the **demand** - **supply** equation:

Year	**Total** availability (in lakh litres)	Total requirement	Surplus for fuel
1995-96	4398.75	3160.10...	

...CONCEPT TERMS: **Inventory**

14/3,K/4 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02524394 116351332
Integrating the use of computers in logistics education
Rao, Kant; Stenger, Alan J; Wu, Haw-Jan
International Journal of Physical Distribution & Logistics Management
v28n4 PP: 302-319 1998
ISSN: 0960-0035 JRNL CODE: IPD
WORD COUNT: 5701

...TEXT: the interface between marketing and logistics. Differences between logistics and accounting in measuring and valuing **inventory** are also discussed. Some examples of **inventory** valuation methods are given in a simple spreadsheet set-up. The logistics decision process, corporate... model serves as a basis for discussion when later in the class a more advanced **inventory** theory and transport/ **inventory** joint decision-making concepts are introduced.

Forecast demand is the foundation for logistics planning. The...

...actual" data supplied by the instructor to perform validation.

After forecasting, the course moves into **inventory** planning, control techniques and requirements planning, where considerable time is spent. DRP, MRP and MRP...

...methods are illustrated using a Lotus 123 spreadsheet model with built-in decision rules for **inventory** replenishment and order release decisions utilizing concepts of order quantity, reorder point, lead time and...

...nature of these systems for different logistics environments is also discussed.

During this discussion on **inventory** management, the simple material flow simulation assignment introduced in the beginning of the flow planning...

...exercise, for instance, students are asked to use a spreadsheet template to calculate savings from **inventory** reduction, transport consolidation, warehousing efficiency, trans-shipment reduction, and faster error reconciliation and error reduction...In the case of the Baxter Paper Products Inc. exercise, which focuses on transport and **inventory** interrelationships, students are given a spreadsheet framework to analyse a database consisting of several products...
...customer regions to distribution centres (DCs), DC demand to plants, and raw material demand to **supply** sources. In addition, **aggregate production** plans and **inventory** levels by month are planned at each location. A DSS-type software program called Freight...

...similar to the Burlington Nothern's Ship Smart package, gives estimates on shipment size, average **inventory** , **safety stock** , service level and all the cost elements in the total logstics cost model. The results...

...sizes, employ different levels of forecast accuracy and flow planning methodologies (DRP, Reorder Point), set **inventory** availability targets, and use a linear programming subroutine to perform allocation tasks.

The MAS simulation...

...students retain the current network but alter short-term operating policy elements. These elements include **inventory** availability levels at each location, safety stock at plants, transport modes used, production capacity (within limits), forecasting method, **inventory** planning method, and the mix of procurement from raw material sources. This practice allows them...the course:

- (1) Spreadsheet models for material flow simulation;
- (2) Spreadsheet models for time-phased **inventory** analysis;
- (3) Forecasting models;
- (4) **Inventory** and transport decision support analysis;
- (5) Allocation planning;
- (6) Network design.

According to the student...

...sections were given an assignment to complete on the subject matter

being covered which was **inventory** relationships. In addition, students were also told to keep track of the time it took...

...be rejected but the second one could. All three sections performed equally well on the **inventory** assignment. However, there was a noticeable and statistically significant difference in the time taken to...
...comforting in its conclusion that it is still possible to convey to students the key **inventory** concepts and principles involved without the use of computerized teaching. The benefit of the computer...

...of the results of using computers (although this difference was not statistically significant). Since the **inventory** assignment is much less complicated than later assignments in the course, the time savings are...
include the strategic profit model, dynamic break-even analysis, forecasting and evaluation of various techniques, **inventory** planning, requirements planning, allocation planning and network simulation. The use of several general- and special...

14/3,K/5 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02524393 116351331
Educational development for marketing logistics
Christopher, Martin; Magrill, Leonard; Wills, Gordon
International Journal of Physical Distribution & Logistics Management
v28n4 PP: 234-241 1998
ISSN: 0960-0035 JRNL CODE: IPD
WORD COUNT: 3977

...TEXT: from the buying in of the raw materials through to the control of finished goods **inventory** . "Physical distribution management" on the other hand refers, under this scheme, only to that part of the corporate activity which starts with finished goods **inventory** and ends with the customer. Thus, it may be seen that the subject area of...the service level implications of their decisions and they should also relate these to the **inventory** policy which they execute. Most of all they ought to view the whole distribution activity...

...operations research techniques so as to increase the efficiency of activities such as vehicle scheduling, **inventory** control and other such problems. They ...System Design; Distribution Cost & Revenue Analysis; Role of Service in Marketing; Communication in the Channel; **Inventory** Control, (a) Order Quantity & **Safety Stock** , (b) **Demand** Forecasting, (c) **Aggregate** Control of **Inventory** ; Warehouse Management; Materials Handling & Packaging; Transport: Technology; Transport: Institutions; Transport Management; Quantitative Methods (a) Linear...

14/3,K/6 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02352623 115619814
Alternative channels of distribution e-commerce strategies for industrial manufacturers
Lawrence, F Barry; Zank, Gail M; Jennings, Daniel F; Stading, Gary L; Et al
Production & Inventory Management Journal v42n3/4 PP: 34-45 Third Quarter 2001

ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 6288

...DESCRIPTORS: **Inventory** management
...TEXT: direct access on the part of the manufacturer. Perhaps the most visible of these is **inventory** management.

FIGURE 1:

Inventory exists solely because the supply chain is inherently inefficient. Assume that a company knows with...

...can source from suppliers or its own processes (manufacturing) with zero process variability The only **inventory** the firm would have to carry is enough to cover demand during the difference between...
...is highly unlikely at this time.

The direct channel, however, may offer ways to reduce **inventory** . The **inventory** drivers, forecast error and process variability, are information dependent. Internet sales are direct to the...

...slows the progress of information and introduces error through lost or filtered data and irregular **inventory** -tracking methodologies that differ from intermediary to intermediary. End-user demand tends to follow a...

...scheduling with their suppliers. These longer lead times (compared with customer lead times) force the **inventory** back on the intermediary (distributor), giving the appearance that disintermediation will result in huge **inventories** coming back upstream to the distributor's supplier [5]. As a result, the supply chain has more **inventories** than it would if the supplier could efficiently handle the end-user demand directly (see fig. 2).

The key question is, Will the reduction in **inventory** brought about by direct sales compensate for carrying **inventory** at the supplier's operation, where holding costs (on a per-unit basis) may be...
...also consider whether the same technology that will reduce the manufacturer's need to carry **inventory** could be effectively applied to reduce the intermediary's **inventory** . If so, supply ...the supply chain are technical support for end users, financial services, product value adds, local **inventories** , counter sales, transportation services, and a prospecting sales force. Each of these areas can be...

...activities should be postponed in the supply chain for as long as possible [1].

If **inventory** is at a distribution center only, the distributor will carry less **inventory** (no **safety stock** at remote locations) and the location value-added activity is postponed. The onus is on...

...supply chain integration, they will cooperate (many already have) and help the supplier to reduce **supply** chain **total** costs. In retail channels, large retailers such as Wal-Mart have already begun providing real...

...The key issue for a manufacturer selling direct is whether the forecast improvement will reduce **inventory** enough to justify cutting out the distributor's DC.
Transportation services fall into two categories...

...For retailers, the counter sales area is the principal business, which they support with stringent **inventory** demands on suppliers (consignment, Vendor Managed **Inventory** programs, "A" item only restrictions, high fill rates, and tough supplier buyback policies). Retailers' increased...

...to a crisis (distributor strength) would be less likely. The manufacturer could maintain a local **inventory** through a 3PL warehousing company but would, in effect, be duplicating the distributor's service... could benefit by selling through the first contact distributor. A distributor using another distributor's **inventory** would pay a price premium over cost that would compensate the supplying distributor for carrying the **inventory** . Distributors unwilling to participate in the supplier's Web commerce site would be forced to...

...cost. Real-time communication between the manufacturer, distributors, customers, and retailers will reduce supply chain **inventory** . A likely outgrowth of this process would be the creation of a sort of "master...

...items other distributors consider to be "B" and "C" items to carry these items in **inventory** . The hits from other distributors through the Internet would enable the master distributor to treat these items as "A" items and relieve the other distributors of dead or risky **inventories** .

This network does not include retailers, because the customer is directed to the distributors. Retailers...

...becoming rare and could disappear entirely).

Distributors can fulfill another role for the manufacturer. All **inventory** could reside at the distributor's site, presumably less expensive than the supplier's **inventory** , and the distributor could provide service to the retailer through the manufacturers' Web site. The...

...and the manufacturer would compensate the distributor for serving the retailers. The distributor's local **inventory** and services would greatly facilitate retail programs such as vendor-managed **inventory** (VMI) and JIT. Home center stores with large distribution centers that buy at a volume distributors cannot meet would receive products directly from the factory. **Inventory** maintenance, however, will be more efficiently handled through the distributor's local presence when-not...impediments to EC are reduced in this model. Technical support, financial services, product enhancements, local **inventories** , counter sales, transportation services, and the prospecting sales force remain in place at the distributor...

...match customer needs with supplier capability. The result would be a channel with greatly reduced **inventories** and a greatly enhanced customer service level.

Inventory would be reduced through more-timely customer information leading to improved forecasting. In addition, more...

...other lead-time reduction capability. Because lead times and forecast error are the only reasons **inventory** is carried in the supply chain, the end user would have a choice between minimizing...

...have been scarce). Most customer relationships have been based on availability and have driven large **inventories** . The distributorcontrolled EC strategy will require system-to-system connections that allow for better forecasting...

...merits further investment.

The strength of this strategy is that it continues to outsource the **inventory** , financial, sales, and other distributor activities that would have to be taken in-house under...

...or in deed. The distributors could also be encouraged to carry out the information- and **inventory** -sharing model suggested earlier. Consortiums of the supplier's distributors could band together and leverage their **inventory** .

The weaknesses from a supplier viewpoint involve the necessary commitment the supplier must make to...because both systems will be in place. Note also that the previously suggested distributor shared **inventory** model is still possible under this model.

The downside of this model is that essentially...

...in the transition. In addition, even though the exchange of real-time information will reduce **inventory** at all points in the chain, supply chain cooperation is lower under this model, and...

...wholly independent company It would act as both a clearinghouse for dead or slow-moving **inventory** and a direct sales medium for distributors and manufacturers. This sort of site is springing...
...complementary databases.

The clearinghouse function would help distributors, retailers, and manufacturers remove redundant or obsolete **inventory** from the channel. As a direct sales medium it would allow all parties to deal...

...the channel may have a primarily positive effect by handling low-margin or slow-moving **inventory** , freeing the channel members to deal with their strongest (most profitable) markets.

The supplier may...McGraw Hill, 2000.

4. Lawrence, F.B. "Closing the Logistics Loop: A Tutorial." Production and **Inventory** Management Journal 40, no. 1 (1999): 43-50.

5. Lawrence, EB, and A. Varma. "Integrated Supply: Supply Chain Management in Materials Management and Procurement." Production and **Inventory** Management Journal 40, no. 2 (1999): 1-5.

6. Narayandas, D., and S. Frug. Arrow...

...His research interests include logistics and supply chain management, electronic commerce, and specific issues involving **inventory** and information systems. He has published articles in professional, academic, and society journals including Production and **Inventory** Management Journal, Journal of Operations Management, Journal of Engineering Technology, and Indus

trial Distribution Magazine...

...automation and layout for electronic distribution, warehouse and transportation logistics for electrical distribution, warehouse/transportation/ **inventory** management/customer service for steel distribution, and distribution information systems.

GAIL M. ZANK, Ph.D...in chemical engineering from the University of Illinois. He also holds CQE (quality) and CPIM (**inventory** management) certifications. Using his training as an ISO 9000 lead auditor, Dr. Stading has seen...

...Research and the Management Sciences, the American Society for Quality, and the American Production and **Inventory** Control Society.

ROBERT J. VOKURKA, Ph.D., is an Assistant Professor in the Department of... ...Operations Management, International Journal of Forecasting, International Journal of Operations and Production Management, Production and **Inventory** Management Journal, Industrial Management & Data Systems, and the Journal of Marketing Theory and Practice. He holds professional certifications in production and **inventory** management (CPIM), integrated resource management (CIRM), purchasing (CPM), quality (CQM), and accounting (CPA and CMA...

14/3,K/7 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02330464 110658048
The value of production schedule integration in supply chains
Krajewski, Lee; Wei, Jerry C
Decision Sciences v32n4 PP: 601-634 Fall 2001
ISSN: 0011-7315 JRNL CODE: DSI

...DESCRIPTORS: **Inventory** management

...ABSTRACT: chains involving buyer and supplier firms. A stochastic cost model is developed to evaluate the **total supply** chain cost with integrated purchasing and scheduling policies. The model minimizes the costs associated with assembly rate adjustment, **safety stock** and schedule changes for all supply chain members. The paper examines the impact of several...

...absorb costs in excess of those they would incur with independent scheduling. Environments with high **inventory** holding costs and long supplier lead times may not find it beneficial to adopt an...

14/3,K/8 (Item 5 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02323691 86923283
Measuring the bullwhip effect in the supply chain
Fransoo, Jan C; Wouters, Marc J F
Supply Chain Management v5n2 PP: 78 2000
ISSN: 1359-8546 JRNL CODE: SCMG
WORD COUNT: 6658

...TEXT: can be determined for the entire supply chain.

(2) Order batching. Demands come in, depleting **inventories** but the company may not immediately place an order with its supplier. It often accumulates...

...When the price returns to normal, the customer buys less than needed to

deplete its **inventory** . Stabilizing prices and decreasing the number of promotions is a way of reducing this effect...the DC and the measurement should explain to what extent there is an amplification of **demand** fluctuation compared to **total** consumer **demand** per supermarket. This is an example of [omega][sub]3. As another example, suppose that...

...DC experiences the problem of having to discard too many of some perishable products. High **safety** **stocks** are needed in the DC, because orders from supermarkets vary greatly. Here we are interested...

...imagine that a supplier has problems producing all orders received from a particular DC, because **total** **demand** varies greatly from week to week. We would want to find out whether there is...these DCs was part of the SNEL project. For the meals, this DC keeps an **inventory** of several days. Delivery frequencies to individual retail franchisees vary between one and seven times...

...franchisees with these ready-made meals.

The second chain supplies salads. The producer has an **inventory** of several days and products are coded with a shelf life of about 30 days... when placing orders with the supplier. The people with the supplier who manage finished goods **inventory** and plan production amplify demand variability by 1.75 when making the production plan. The...

...orders do come through and are delivered, the franchisees are suddenly stuck with very high **inventory** levels of fairly perishable products, and they react by deflating orders as much as possible...in the Grocery Industry, January.

6. Lee, H. and Billington, C. (1992), "Managing supply chain **inventory** : pitfalls and opportunities", Sloan Management Review, Vol. 33 No. 3, pp. 65-73.

7. Lee...

14/3,K/9 (Item 6 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02310214 102743421
Supply chain metrics
Lambert, Douglas M; Pohlen, Terrance L
International Journal of Logistics Management v12n1 PP: 1-19 2001
ISSN: 0957-4093 JRNL CODE: INLM
WORD COUNT: 8898

...TEXT: lead time, fill rate, or on-time performance. In many instances, these measures are financial (**inventory** turns and overall profitability), but they do not provide insight regarding how well key business...

...when we asked executives to identify examples of supply chain metrics. Typically, the executives identified **inventory** turns as one of the measures of supply chain performance, a view shared by several authors [3]. However, as a supply chain metric, **inventory** turns is not an effective measure and provides a useful example of why new metrics are needed for managing the supply chain.

An **inventory** turns measurement fails to capture key differences in product cost, form, and risk within the supply chain. Figure 1, which

illustrates **inventory** positions and flows across a supply chain, helps make this point. As **inventory** moves closer to the point of consumption, it increases in value. That is, the out-of-pocket cash investment in the **inventory** increases.

Consequently, if the opportunity cost of money and the **inventory** turns are similar, **inventory** carrying costs are much higher at the retail level, and an **inventory** turn improvement by the retailer has a much greater effect on overall supply chain performance...

...the supplier, manufacturer, wholesaler and retailer are all achieving six turns and have a similar **inventory** carrying cost of 36 percent, an improvement to seven turns would be worth $0.04...

...for each of the parties, respectively. This example illustrates that the common practice of pushing **inventory** forward in the supply chain may reduce overall supply chain performance. Current **inventory** turns at each level within the supply chain also must be considered. Figure 2 shows how the **inventory** carrying cost per unit changes with the number of **inventory** turns. While Figure 2 reflects the manufacturer data from Table 1, the shape of the...

...is identical for the supplier, distributor/wholesaler and retailer. Now, let's reconsider how existing **inventory** turns at various tiers in the supply chain will affect the general rule that **inventory** , or **inventory** ownership, should be moved backward in the supply chain. If the manufacturer is only achieving...sold for the wholesaler. In this case, the general rule is broken.

In addition, an **inventory** turn rate does not recognize the different forms or the risk of holding **inventory** . Raw materials held by the supplier may be used for multiple products or customers. This situation makes it difficult to determine how downstream changes would affect the amount of **inventory** held by the supplier. An **inventory** turns metric does not consider risk. The further downstream the **inventory** , the greater risk that it does not exactly meet consumers' requirements. Pushing the **inventory** backwards and postponing its final form permits the supply chain to avoid higher obsolescence costs and the cost of repositioning **inventory** when it has been deployed to the wrong location.

A single **inventory** turn metric for the supply chain cannot capture the differences that an improvement in turns...

...have at each level or for the total supply chain. Performance, as measured by total **inventory** carrying costs, would be a better measure since it considers both the cash value of the **inventory** at various positions in the supply chain as well as varying opportunity costs for **inventory** investments for various supply chain members 141. Total **inventory** carrying cost is improved by pushing **inventory** backwards in the supply chain toward the point of origin. The further back, the lower the overall **inventory** carrying costs for the entire supply chain. In summary, **inventory** turns and other commonly used logistics measures are inadequate for evaluating and aligning performance across...chain versus supply chain" form of competition. The overlap results in many instances of shared **inventories** , shared services, and shared assets between supply chains [50]. Managers cannot easily determine how business...

...drive total supply chain performance. As was pointed out earlier, you cannot simply add up **inventory** turns for participating firms and arrive at a total for the supply chain.

Despite the...

...example, the CRM team may negotiate with the customer's team to implement supplier managed **inventory** (SMI). Successful SMI implementation may lead to increased revenues as the customer allocates a larger...
...reduces costs and can yield a price reduction for the consumer, revenues may increase as **total** sales for the **supply** chain increase. Revenues may increase as a result of better in-stock availability at the...

...one-time decrease in sales when SMI is implemented and the customer uses up existing **inventory** . The supplier's expenses may increase as the company assumes ownership of, and responsibility for, the customer's **inventory** ; however, other expenses may decrease due to reduced order processing and forecasting costs. **Inventory** carrying costs decrease as point-of-sale data are used to schedule shipments instead of forecasting requirements and maintaining **safety stock** . Better capacity utilization and collaborative planning and forecasting of requirements may reduce the need for...smaller number of suppliers. Expenses decrease as the supplier assumes responsibility for order placement and **inventory** management. Pushing the ownership of **inventory** backwards to the supplier reduces **inventory** carrying costs for the customer and for the total supply chain since the supplier owns the **inventory** at a lower cash value (see Figure 1). Together, the CRM and SRM processes capture...

...are deducted to calculate a contribution margin. Assignable nonvariable costs, such as slotting allowances and **inventory** carrying costs, are subtracted to obtain a segment controllable margin. The net margin is obtained...

...obtain the net segment margin. These statements contain opportunity costs for investments in receivables and **inventory** and a charge for dedicated assets. Consequently, they are much closer to cash flow statements...

...chain performance than existing measures.

Figure 6

Figure 7

Functional or logistics measures, such as **inventory** turns, cannot capture the full extent of management cost trade-offs and can be easily "gamed." As previously described, **inventory** carrying cost is a better measure, but it does not capture the costs incurred to achieve the reduction in **inventory** . Increases in production setup costs, transportation costs, ordering costs and lost sales costs may more than offset any gains made in **inventory** carrying costs. Typically, **inventory** reductions have a greater impact on total supply chain performance if they occur at the retail level. Generally speaking, making to order, pushing **inventory** backwards or pushing **inventory** ownership backwards in the supply chain improves overall performance. A combined customer-supplier profitability analysis will capture how the repositioning of **inventory** improves total supply chain performance, whereas **inventory** turns does not reflect any of the cost trade-offs within a firm or in...actually measures of internal logistics operations as opposed to measures of supply chain management.

... an **inventory** turn improvement by the retailer has a much greater effect on overall supply chain performance than a turn improvement by the supplier...

... **inventory** turns and other commonly used logistics measures are inadequate for evaluating and aligning performance across...

...processes and between firms.

A combined customersupplier profitability analysis will capture how the repositioning of **inventory** improves total supply chain performance whereas **inventory** turns does not reflect any of the cost trade-offs within a firm or in...

...New Battleground: The Integrated Value Chain," Cambridge, MA: Cambridge Technology Partners, p. 19; and, "Driving **Inventory** Control with Best-In-Class Planning Practices," Signals of Performance, Vol. 2, No. 4 (2001...

...1 (2000), pp. 65-83.

[8] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573; Larry...4 (1998), pp. 187-192.

[13] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573; "Supply...

...Research, 1999, pp. 287-297.

[16] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573.

[17...
...Education and Research Council, 1998.

[33] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573.

[34] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573.

[35...

...Managing the Demand Chain Through Managing the Information Flow: Capturing 'Moments of Information,'"

Production and **Inventory** Management Journal, First Quarter (1999), pp. 16-20; and, Andrew K. Reese, "Metrics Mentality," iSource...

...Managing the Demand Chain Through Managing the Information Flow: Capturing 'Moments of Information,"' Production and **Inventory** Management Journal, Vol. 40, No. 1 (1999), pp. 16-20.
[39] van Hoek, Remko I...4 (1998), pp. 187-192.

[43] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573; and...

...No. 10 (2000), pp. 847-868; Hau L.Lee and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 65-73...

...12 (2000), pp. 1411-1426.

[48] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, Vol. 33, No. 3 (Spring 1992), pp. 6573; and...

...South America, Europe, Asia and Australia. He is the author of The Development of an **Inventory** Costing Methodology, The Distribution Channels Decision, The Product Abandonment Decision and co-author of Management...

14/3,K/10 (Item 7 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02271902 86923225
Constraints to quick response systems in the implosive industries
Lehtonen, Juha-Matti; Holmstrom, Jan; Slotte, Jonas
Supply Chain Management v4n1 PP: 51 1999
ISSN: 1359-8546 JRNL CODE: SCMG
WORD COUNT: 3730

...TEXT: make-to-order. The production can be directly controlled by customer orders. No finished goods **inventory** is needed.

- A decoupling point in the middle of the production process can be found ...

...to-order. Products are manufactured and delivered according to customer orders from a semi-finished **inventory** that is held at this point. As the product variants in the implosive industries increase...

...meet the delivery time requirements, the products have to be delivered from the finished goods **inventory** . Production is controlled by more or less accurate demand forecasts. In the implosive industries the...
...1994) cutting lead times and changes in purchasing enabled both increased customer service and decreased **inventory** in a make-to-stockenvironment. Compagno's (1992) Quick Response includes, in addition to fastercustomer...

...stock and make-to-order production.

In our definition of Quick Response in production and **inventory** control for the implosive industry manufacturer make-to-order or assemble-to-order type production control is required:"

Quick Response in production and **inventory** control is the ability to plan, manufacture and deliver the full product range within a...

...how the company wishes to position its products is beyond the scope of production and **inventory** control. In ...even one product range cycle, all the demand cannot be met without load-levelling buffer **inventory** . A Quick Response concept that excludes make-to-stock does not alleviate the problem of...

...have personally been involved in each case. All cases are based on production, demand and **inventory** data of at least half a year.
Case 1: production and **inventory** control of a fine paper mill

The fine paper mill has a very large product...

...the minimum production batch size. For low selling items the minimum batch size causes large **inventories** . This make-to-stock arrangement has a low finished goods **inventory** turnover of six times a year.

Case 1 identifies minimum production batches as a constraint...deliveries can be made inside the customer acceptable delivery time. Theobvious drawback is a sizeable **inventory** investment with an **inventory** turnover of eight times a year. The fast response is limited to customer specific stock...

...which is the so-called Burbidge effect identified by John Burbidge. In a reorder point **inventory** control system the individual product **inventories** are replenished independently, which makes the re-order periods irregular. Irregular control periods cause short...

...he showed that a multi-tier supply chain with long lead-times and independently set **inventory** control policies in each tier can amplify small random variations in the end demand and cause chainwide oscillations in demands and **inventory** levels. In the original simulations by Forrester these oscillations were of relatively long cycle time. Towill (1992) identifies the causes of Forrester effect as long lead-times, independently set **inventory** control policies and poor communication.

The consequences of the Forrester effect are alternating periods of...the communication of customer demand information over organisational boundaries by the means of reorder point **inventory** systems made demand appear unpredictable at the producer.

Conclusions

In the implosive type industries static...

...there seems to be plenty of capacity within a budget year's time frame, the **total demand** during aproduct range cycle can exceed capacity due to demand variability. If possible, flexibility in...

...want to maintain 100 per cent capacity utilisation and delivery service we have to maintain **buffer stock** for the whole product range to smooth even minor demand variations. High capacity utilization, Quick...
...Engineering Series 73, Helsinki.

7. Jostes, T. and Helms, M. (1995), "The use of buffer **inventory** as an asset-management tool in a quick-response environment", Production and **Inventory** Management Journal, 3rd quarter, pp. 17-22.

8. Park, S. (1994 "Quick Response with overseas production", Production and **Inventory** Management Journal, 4th quarter, pp. 11-14.

9. Shingo, S. (1981), Study of Toyota Production...

14/3,K/11 (Item 8 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02087624 63686150
The design of a jit supply chain: The effect of leadtime uncertainty on safety stock
Schwarz, Leroy B; Weng, Z Kevin
Journal of Business Logistics v21n2 PP: 231-253 2000
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 6611

...ABSTRACT: outside supplier, an inbound carrier, a manufacturer, and an outbound carrier. The chain replenishes the **inventory** of a set of manufacturer-owned distributors who serve retailers. The research aids the design...

...distributor safety stocks, which depend on the variance of the distributors' end-of-cycle net **inventory** . Second, and most important, an examination is made of the variance in the distributors' end-of-cycle net **inventory** under two different allocation schemes.
...TEXT: outside supplier, an inbound carrier, a manufacturer, and an outbound carrier. The chain replenishes the **inventory** of a set of manufacturer-owned distributors who serve retailers. Neither the manufacturer nor the outside supplier maintain finished goods **inventories** and material is pulled through the chain in response to demand, which is periodic, stochastic...

...demand uncertainty, jointly creating an overall level of uncertainty against which the distributors' safety stock **inventory** must buffer. The mean leadtime of each link also affects system pipeline **inventories** . These and their associated per-unit **inventory** holding costs are among the cost drivers in the design of the supply chain. Others...

...Our research aids the design process in two ways. First, we derive expressions for distributor **safety stocks** , which depend on the variance of the distributors' end-of cycle net **inventory** . These safetystock expressions and their associated **inventory** holding costs can be easily incorporated into an optimization model for minimizing **total supply** chain costs.' Second, and more important, we examine the variance in the distributors' end-of-cycle net **inventory** under two different allocation schemes. When the manufacturer allocates to each distributor the amount it ...

...when the manufacturer allocates "fair shares" of the amount produced in order to equalize distributor **inventory** positions (on-hand plus on-order minus backorders) to the extent possible. Although fair-shares...
...such a scheme - recently popularized by Wal-Mart - can so dramatically reduce the amount of **safety stock** in the distribution of consumable products.

The next section describes our model in detail. We...

...is the expression for var(Ig), the variance of the distributors' end-of-cycle net **inventory** under as-ordered allocation. This section also illustrates the substantial effect of leadtime uncertainty on...

...over time. Nonidentical and correlated distributor demands are discussed in the section on extensions. Distributor **inventories** are replenished as follows. Every H periods every distributor places a replenishment order with the manufacturer that restores its **inventory** position (on-hand plus on-order minus backorders) to a fixed base tock level Br. Between replenishments, distributors satisfy demand from on-hand **inventory** .

Demand in excess of available **inventory** is backordered. There is no transshipment among distributors. Distributor base stocks are set to provide...

...where F is the expected fraction of H-period retailer demand filled from on-hand **inventory** .
The manufacturer receives the collection of distributor orders immediately (i.e., the ordertransmission leadtime is...outside supplier, manufacturing costs, and the holding costs incurred on the pipeline and safety stock **inventory** .

The supply chain modeled here can, of course, be viewed as a multiechelon productioninventory system...

...a recent survey.' As shall be seen, however, the fact that only the retailers carry **inventory** , in effect, reduces the multilevel system operating under as-ordered allocation to a single-level stochastic **inventory** system with stochastic leadtimes. Fair-shares allocation yields a modified single-level model.

Fair-shares...

...demand. In those situations it may be unrealistic, even foolish, to consider consolidating demand and **inventory** at a single site (or at m </= N sites). Yet, it is possible to capture...

...that all processing and transportation leadtimes are faced and that the warehouse does not hold **inventory** . The mathematical model examined here can be viewed as extending Schwarz's risk-pooling model...

...and Marchet. That is, management should choose the design that requires the lowest level of **inventory** investment necessary to provide a pre-specified level of customer service. Masters makes this design...

...more explicit and comprehensive by developing an optimization model to minimize total expected costs for **inventory** holding, lost sales, and transportation for the warehouse-retailer system." His decision variables include each site's base-stock **inventory** and the average systemwide fixed transportation leadtime. His optimization framework is easily extended to incorporate...

...Schwarz, and Ward;19 and Tagaras and Cohen.20 The effect of stochastic leadtimes on **inventory** policy has been assessed by a number of researchers, including Sphicas;21 Ehrhardt,22 Nevison...

...Average distributor replenishment leadtime, Lc, is:

The Probability Distribution of Distributor End-of Cycle Net **Inventory**

If all four leadtimes in the supply chain are fined, then, of course, Lc is ...applied. The case study provides an example.

The Effect of Supply-Chain Leadtimes on System **Inventory**

Given the leadtime parameters of the supply chain and the probability distribution of Ihr, it...

...numerically (for example, bisection) for Br. Once Br has been determined, the distributor safety stock **inventory** required to provide the given fill rate is easily computed using (2).

To illustrate the...

...average, 95 percent of retailer unit demand each cycle is filled from on-hand distributor **inventory**) in the DLT scenario, each distributor requires a safety stock of minus 57 units, but...

...To this point our analysis has focused on two drivers of supply chain costs: pipeline **inventory** , which is proportional to mean supply chain leadtime (Lc), and distributor safety stock, which depends on the variance of distributor end-of-cycle net **inventory** (var(IH)). Other drivers include the per-unit component cost, the per-unit inbound and...
...of service desired (in our model, the target fill. rate F) and the minimum possible **total** **supply** chain cost associated with that level of service. This minimum possible cost results from solving...

...are the leadtime parameters for all the links in the supply chain, the system pipeline **inventory** (which depends on the mean leadtime in each link), and the distributors' **safety** **stock** . This optimization problem is easily formulated, at least in general terms. The formulation by Masters...

...have been chosen - not necessarily the optimal ones - and that, as a consequence, the pipeline **inventory** and **safety** **stock** to provide the required level of retailer service have also been determined (as described above). Thus, **total** **supply** chain cost has been determined. The question is: How will **total** **supply** chain cost be affected by changing the mean and variance ofthe leadtimes and redetermining distributor **safety** **stocks** under as-ordered allocation?

The Importance of Reducing the Variance in Supply Chain Leadtimes

Note...link in the supply chain yields a payoff in terms of reducing its corresponding pipeline **inventory** holding cost. The resulting reductions in Lc, average supply chain leadtime, also reduce var(IH...
...reduction in any of these averages yields a payoff both in reducing the corresponding pipeline **inventory** and in reducing the distributors' safety stock holding cost.

Note also that since the average...

...ALLOCATION

Fair-shares allocation provides supply chain managers the opportunity to reduce the amount of **safety** **stock** required to **buffer** against any given level of demand and/or leadtime uncertainty. This is accomplished by postponing...

...shipped. Units are then allocated in order to equalize as much as possible the distributors' **inventory** positions (on-hand plus on-order minus backorders), measured as the fractile of distributor demand satisfied by the resulting allocations. This process is often called "balancing distributor **inventories** ." For distributors with identical distributions of customer demand over their replenishment leadtimes, as modeled here, this means equalizing their **inventory** position as much as possible (without negative allocations or transshipments). Note that under fair-shares allocation, the manufacturer will **produce** the same **total** amount ordered by the distributors under as-ordered allocation. Furthermore, the average amount allocated to...

...improving the performance of the well-known METRIC system for managing

recoverable (that is, reparable) **inventories** ." Under METRIC, repaired units are shipped in first-come-firstserved order to the depots that...

...scheme is optimal for a modified (that is, simplified) version of METRIC.

Assuming that distributor **inventories** can always be balanced under fair shares, the resulting variance of distributor end-of-cycle net **inventory** , denoted varf(Ig), is given by

In other words, the mean and variance in the...

...shares by using a satellite information system to report on each store's daily ending **inventory** . This information is used the following day to allocate available **inventory** from distribution centers among the stores each serves.

CASE STUDY
Consider a consumer electronics manufacturer100. Currently, distributioncenter **inventories** are reviewed every thirty days (H=30). Management's desired service level is F = 99...

...chosen base-stock levels, 1,000 observations of the retailers' end-of-cycle on-hand **inventory** were generated. Figure 5 provides the histogram. Note that although daily distributor demand is not normal, the histogram of distributor end-of cycle net **inventory** is approximately normal, with mean E(IH) = 458 units, and var(Ig) = 301 units. To...

...Note that in order to achieve a 99 percent fill rate, distributor base-stock level **inventories** must be set to 3,653 units; and given var(Ig), average distributor end-of-cycle on-hand **inventory** equals 458 units (approximately 10 days of supply)" In scenario 2, daily demand uncertainty, (a...

...to 7,11 , respectively. Compare the corresponding reductions in distributor end-of-cycle on-hand **inventory** : The 17.9 percent reduction (from 458 to 376 units) due to a one-third...

...indicates that if demand uncertainty could be eliminated, then average distributor endof-cycle on-hand **inventory** could be reduced by 3.9 percent. Scenario 5 indicates that if leadtime uncertainty could be eliminated, then this **inventory** could be reduced by 73.8 percent.

The Payoff From Fare Shares Allocation

We also...

...the effect of a fair-shares policy on distributor average end-of-cycle on-hand **inventory** . Scenario 6 uses the same parameters as scenario 1 (current policy) except that fair-shares...

...from 3,653 to 3,430 units, but that average end-of-cycle on-hand **inventory** falls dramatically, from 458 to 235 units. This represents a substantial reduction of system safety stock and **inventory** holding cost. Scenarios 7 through 10 correspond to scenarios 2 through 5, respectively, except that...

...expressions above (that is, for the mean and variance of distributor end-of-cycle net **inventory**) for nonidentical distributors.36 Broadly speaking, these expressions can then be interpreted to yield the...

...they demonstrate that, everything else being equal, the variance of distributor's end-of cycle **inventory** increases with increases in the correlation of demand among distributors (and over time). This suggests... they show that fair-shares allocation is more likely to be able to balance distributor **inventories** (without negative allocations) when distributor demand is correlated.

More Than One Outside Supplier

If there...

...supply chain terms) and then, at the moment of allocation, determine the status of distributor **inventories** . The cost of these capabilities is, of course, situation dependent. But to the extent that...

...in estimating (forecasting) p and a

sup 2

will typically cause the wrong base-stock **inventory** policy to be chosen by distributors. If base stocks are too small, then the system...

...are too large, then management's specified target fill rate will be exceeded, and distributor **inventory** holding costs will be unnecessarily high. Second, if a significant amount of time is required...

...of customer demand, a

sup 2

.

MODELING THE EFFECT OF MANUFACTURER AND/OR OUTSIDE SUPPLIER **INVENTORIES**

Our characterization of the supply chain analyzed here as "JIT" carries with it the assumption that neither outside suppliers nor manufacturers routinely maintain **inventories** of their products. This is in keeping with one of the primary goals and/or...

...the heart of our analysis requires this assumption, but our model can be applied when **inventory** is carried at either or both of these sites. In our case study for example, finished goods **inventory** carried by the outside supplier would affect both the mean LS and the variance os2 of its leadtime distribution (increasing amounts of finished goods **inventory** at the outside supplier typically would reduce both LS and QS
sup 2

). Explicit analysis of **inventory** holding by either the outside supplier or manufacturer is beyond the scope of our model...

...supply chain, management should not focus on the choice of any single component, such as **inventory** policy or transportation mode since interactions among components affect overall supply chain performance and costs...

...interactions between the variance of the leadtimes in each link of the chain and system **inventory** holding costs. Given the nature of these (and other) interactions, we recommend that supply chain...

...example, see J. M. Masters, "Determination of Near Optimal Stock Levels for Multi-Echelon Distribution **Inventories** ," Journal of Business Logistics 14, No. 2, (1993): 165-94.

2R. G. Brown, Advanced Service Parts **Inventory** Control, 2nd ed., (Materials Management Systems, Inc., Norwich, VT,1982).

3All leadtimes are assumed to...
...Graves, A. H. G. Rinnoy Kan, and P. H. Zipkin, eds., Logistics of Production and **Inventory** (Amsterdam, The Netherlands: North-Holland, 1993).

7S. Nahmias and S. A. Smith, "Mathematical Models of Retailer **Inventory** Systems: A Review," in R. Sarin ed. Perspectives in Operations Management: Essays in Honor of Elwood S. Buffa (Kluwer Academic Publishers, U.S.A.1993).

8D. H. Maister, "Centralization of **Inventories** and the 'Square Root Law", International Journal of Physical Distribution 6, No. 3 (1976): ...1979): 498-501.

10W. Zinn, M. Levy, and D. J. Bowersox, "Measuring the Effect of **Inventory** Centralization/Decentralization on Aggregate Safety Stock: The 'Square Root Law' Revisited," Journal of Business Logistics 10, No. 2 (1990): 1-14.

11W. J. Tallon, "The Impact of **Inventory** Centralization on Aggregate Safety Stock: The Variable Supply Lead Time Case," Journal of Business Logistics...

...Science 35, No. 7 (1989): 828-42.
14F Caron, and G. Marchet, "The Impact of **Inventory** Centralization/Decentralization on Safety Stock for Two-Echelon Systems," Journal of Business Logistics 17, No...

...16 L. Jackson and J. A. Muckstadt, "Risk Pooling in a Two-Period, Two-Echelon **Inventory** Stocking and Allocation Problem," Naval Research Logistics 36, No. I (1989): 1-26.

17A. Kumar...

...Schwarz, and J. Ward, "Risk-Pooling Along a Fixed Delivery Route Using a Dynan-tic **Inventory** -Allocation Policy," Management Science 41, No. 2 (1995): 344-62.

18E. McGavin, J. Ward, and L. B. Schwarz, "Balancing Retailer **Inventories** ," forthcoming Operations Research.

19E. McGavin, L. B. Schwarz, and J. Ward, "Two-Interval **Inventory** -Allocation Policies in a One-Warehouse N-Identical-Retailer Distribution System," Management Science 39, No. 9 (1993): 1092-1107.

20G. Tagaras and A A. Cohen, "Pooling in Two-location **Inventory** Systems with Non-Negligible Replenishment Lead Times," Management Science 38, No. 8 (1992): 1067-83.

21. Sphicas, "On the Solution of an **Inventory** Model with Variable Lead Times," Operations Research 30, No. 2 (1982): 404- 10.

22F. Ehrhardt, "(s, S) Policies for a Dynamic **Inventory** Model with Stochastic Lead Times," Operations Research 32, No. 1 (1984): 121-32.

23C. Nevison...

...Management Science 30, No. 1 (1984): 100-109.

24P Zipkin, "Stochastic Leadtimes in Continuous Time **Inventory** Models," Naval Research Logistics, 33, No. 4 (1986): 763-744.

25G. D. Eppen and R...

...or o. ao,C2

33B. L. Miller, "Dispatching for Depot Repair in a Recoverable Item **Inventory** System: On the Optimality of a Heuristic Rule," Management Science 21, No. 3 (1974): 316...

...Simulation Modeling and Analysis (New York: McGraw-Hill, 1991).

35If distributor end-of-cycle net **inventories** had been normally distributed, then the required baselevel **inventory** would, according to (5), equal 3,682 units; according to (7), it would equal 487...

...37N. Erkip, W. H. Hausman, and S. Nahmias, "Optimal Centralized Ordering Policies in Multi-Echelon **Inventory** Systems with Correlated Demands," Management Science 36, No. 3 (1990): 381-392.

38S. Nahmias, Production...

...of Production Research, European Journal of Operational Research, Journal of Business Logistics, and Production and **Inventory** Management Journal.

14/3,K/12 (Item 9 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02087620 63686128
Managing a single warehouse, multiple retailer distribution center
Yang, Kum Khiong
Journal of Business Logistics v21n2 PP: 161-172 2000
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 4360

...TEXT: choosing the right policies is important. Although many studies have focused on finding the right **inventory** and vehicle-scheduling rules, none has examined how the environment affects policy choices. This study...

...order processing time, and demand variability. The policies are the warehouse location, vehicle-scheduling rule, **inventory** rule, and order size.

Number of Stores (NS)

Intuitively, the number of stores affects the **inventory** and vehicle-scheduling rules. Many stores mean a large amount of **inventory** in the system, which may increase the value of a good **inventory** rule. Similarly, many stores increase the complexity of the delivery problem, which may increase the...vehicle-scheduling rule. Past studies have shown that CW performs significantly better than NN.10

Inventory Rules (IR)

Two popular **inventory** rules are examined: continuous review (CR) and periodic review (PR). CR monitors the stock level (the total on-hand and on-order **inventory**) at each store continually after every stock transaction. When the stock level falls to or...

...ordered. In comparison, PR checks the stock level (the total on-hand and on-order **inventory**) at each store at fixed, periodic intervals (P). At each review, an order size equal to a target **inventory** (T) minus the current stock level is ordered.

Both CR and PR are widely used...

...zone are placed and delivered in rotation every P days. In contrast, under a CR **inventory** rule, stores in any zone can order on any day.

Order Size (OS)
The implementation...

...however, related. For a similar number of orders generated per unit of time by both **inventory** rules, the values of Q and P are related through average demand, D (i.e...

...of the 288 simulation runs, ten observations were collected for four performance measures: total store **inventory** , demand changes observed at the warehouse, mean number of vehicles, and total travel distance per day. The total store **inventory** (TI) measures the average total **inventory** at all stores. TI is computed by averaging the daily total **inventory** at all stores over each batch length. The demand change (DC) measures the daily changes...

...analysis of variances (ANOVA).14 When significant interactions were detected, they were analyzed.

Total Store **Inventory** and Demand Changes at Warehouse

The ANOVA results on the total store **inventory** (Th) and demand changes at the warehouse (DC) are tabulated in Table 1. The F...on TI, as the number of stores, demand variability, order size, order processing time, and **inventory** rule. Similarly, in decreasing effect on DC, the significant factors and policies are the number of stores, **inventory** rule, demand variability, and order size.

To analyze the significant interaction between the **inventory** rules and the other significant factors, Table 2 summarizes the results on TI and DC. The columns represent the significant factor levels, and the rows represent the two **inventory** rules. Each cell in the table contains two entries. The top number is the total store **inventory** (TI), and the bottom number is the standard deviation of the daily demand changes at...

...order size, and order processing time have a much larger effect on TI than the **inventory** rules. Table 2 reveals that the changes in the cell entries along the rows are...

...factors listed along the rows have a much larger influence on TI than the two **inventory** rules.

TABLE 1

TABLE 2
TABLE 3

Contrary to past wisdom,15 Table 2 shows that CR does not always **produce** less **total** store **inventory** than PR. Researchers have often assumed that CR triggers a replenishment whenever the stock level...

...be ignored in most cases, but it becomes significant (relative to the order size and **safety stock**) when order size and demand variability at the stores are small. Table 2 shows that CR requires more total store **inventory** than PR when the order size and demand variability at the stores are small (Q...

...number of stores, order size, and warehouse location have a much larger effect than the **inventory** and vehicle-scheduling rules on NV and TD.

To identify the environments where vehicle scheduling...

...vehicles (NV) and travel distance (TD) required for deliveries.

To analyze the interactions with the **inventory** rules, Table 5 tabulates the NV and TD produced by the two **inventory** rules against the other significant factors and policies. Consistent with the ANOVA results in Table 3, Table 5 shows that **inventory** rules have a much smaller effect on NV and TD than the other factors and policies. The PR **inventory** rule consistently requires a smaller number of vehicles and total travel distance than the CR **inventory** rule with one exception: when the order size equals a 1-day supply. A Q of 1 day implies a periodic review interval of 1 day. Consequently, under the PR **inventory** rule, the 1-day interval allows each store to order every day, even if the one day, the PR **inventory** rule divides the city into zones and forces the stores in each zone to order...

...when P is larger than one.

CONCLUSION

Although past studies focus on finding the right **inventory** and vehicle-scheduling rules, this study shows that other factors and policies may have a...

...an SWMR system. A smaller number of stores, for example, reduces significantly the total store **inventory** , demand changes at the warehouse, number of vehicles, and total travel distance.
A smaller number...

...size and demand variability at the stores also helps to reduce significantly the total store **inventory** and demand changes at the warehouse. This result supports the use of frequent deliveries to...

...order size and demand variability, therefore, requires a trade-off between the costs of carrying **inventory** and the costs of delivery.

TABLE 5

Although its effect is small relative to the...

...demand variability, managing the order processing time offers another alternative for managing the total store **inventory** . Shorter order

processing time offers the advantage of reducing the total store **inventory** significantly with little or no negative effect on demand changes at the warehouse, number of vehicles, and total travel distance.

This article offers insights about choosing the right **inventory** rule, warehouse location, and vehicle-scheduling rule. In an environment with daily replenishment and small demand variability at the stores, the PR **inventory** rule requires a smaller total store **inventory** than the CR **inventory** rule. In an environment with daily replenishment at the stores, the PR policy, however, requires...

...with past research. The results show that the PR policy produces a larger total store **inventory** but a smaller number of vehicles, total travel distance, and demand change at the warehouse...

...of vehicles and total travel distance significantly, with little or no effect on total store **inventory** and demand changes at the warehouse. The value of a good warehouse location and good...

...good vehicle-scheduling rule.

Finally, the above results show that choosing the right warehouse location, **inventory** rule, order size, and vehicle-scheduling rule is not simple. It requires a tradeoff among...

...study also suggests that past research has focused too much attention on finding the right **inventory** and vehicle-scheduling rules. Instead, the number of stores, demand variability, order size, and order...
...order processing time, therefore, may provide a higher payoff than efforts to choose the right **inventory** and vehicle-scheduling rules.

This study also indicates areas for future research. It reveals that environmental factors have a much larger effect on performance than the **inventory** and vehicle-scheduling rules. Future work should examine the influence of environmental factors in greater...

...variable order processing times. Another possible topic is a detailed comparison of CR and PR **inventory** policies.

This work shows that the CR policy often produces a lower total store **inventory** but a larger demand change at the warehouse than the PR policy. One policy or the other may be preferred under different conditions, depending on the total **inventory** generated at the stores and warehouse.

NOTES

1 S. Anily and A. Federgruen, "Two-Echelon Distribution Systems with Vehicle Routing Costs and Central **Inventories** ," Operations Research 41:1 (1993): 37-47; S. Axsater, "Simple Evaluation of Echelon Stock (R, Q) Policies for Two-level **Inventory** Systems," Institute of Industrial Engineering Transactions 29:3 (1997): 661-669; S. Axsater, "Evaluation of Installation Stock Based (R, Q) Policies for Two-level **Inventory** Systems with Poisson Demand," Operations Research 46: Supp. 3 (1998): 51 35-S 145; L. M. A. Chan, A. Federgruen, and David Simchi-Levi, "Probabilistic Analyses and Practical Algorithms for **Inventory** -Routing Models," Operations Research 46:1 (1998): 96-106; Fangruo Chen and Yu-Sheng Zheng...

...1997): 102-115; E. J. Mcgavin, J. E. Ward, and L. B. Schwarz, "Balancing Retailer **Inventories** ," Operations Research 45:6 (1997): 820-830; and S. Viswanathan and K. Mathur, "Integrating Routing and **Inventory** Decisions

in One-Warehouse Multiretailer Multiproduct Distribution Systems," Management Science 43:3 (1997): 294-312 Practice Cases: **Inventory** and Supplier Management (Singapore: Singapore Productivity and Standards Board, 1997), pg. 15-28.

4 Same...

...Distribution Management, 1976), pg. 119.

8 E. A. Silver and R. Peterson, Decision Systems for **Inventory** Management and Production Planning, 2nd ed. (New York: John Wiley & Sons, 1985), pg. 330.
9...

14/3,K/13 (Item 10 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

02041358 55658645
Reconstructing the sales and fulfillment cycle to create supply chain differentiation
Wouters, Marc J F; Sharman, Graham J; Wortmann, Hans C
International Journal of Logistics Management v10n2 PP: 83 1999
ISSN: 0957-4093 JRNL CODE: INLM
WORD COUNT: 8762

...ABSTRACT: sales and fulfillment cycle are described: 1. reallocating activities to most efficient players, 2. reallocating **inventory** to reduce duplications, and 3. using knowledge of end-user demand to streamline the supply...
...TEXT: reconstructing the sales and fulfillment cycle: i) reallocating activities to most efficient players; ii) reallocating **inventory** to reduce duplication; and, iii) using knowledge of end-user demand to streamline (parts of...

...sales and fulfillment cycle are: i) reallocating activities to the most efficient players; ii) reallocating **inventory** to reduce duplication; and, iii) using knowledge of end-user demand to streamline (parts of...

...average service level (probability of a product being available on stock) having risen to 95%, **inventories** declined by 30% and average **inventory** turnover risen to almost 12. They are a leading company in the industry regarding electronic...that the wholesaler had to rent a building that they used specially for managing the **inventories** and preparing the deliveries.

Nevertheless, this example of deep differentiation is managed as an exceptional...

...efficiency of the chain: the traditional links between supply chain partners; the point at which **inventory** is held in the chain; and, the point at which firm endcustomer orders are placed...site deliveries, and hence more disruptions for the customer.

Decoupling Contracting from the Holding of **Inventory**

A second feature of the traditional sales and fulfillment cycle that can be changed to deliver improved efficiencies is the location of **inventory** . Usually, the party that contracts to supply goods also holds physical

inventories of the goods, which means manufacturers and wholesalers will duplicate **inventory** if the manufacturer sells direct to installers as well as wholesalers.

To maximize economies of scale, only the manufacturer should, theoretically, hold **inventory** . This is because the manufacturer has to carry less **safety stock** , as it partially shielded from the volatility of demand that any individual wholesaler is likely to encounter and only has to cover **aggregate demand** from its wholesalers.

That said, it is not always possible to locate **inventory** as far upstream as the manufacturer because of lead-time constraints. Sometimes **inventory** will have to be held with the wholesaler. But the important thing here is not to duplicate **inventory** costs. If the wholesaler holds **inventory** , the manufacturer should avoid doing so, and vice-versa. This does not mean, however, that the customer can only do business with whomsoever holds the **inventory** . The end customer would still have the possibility to contract directly with the manufacturer or...

...irrespective of who holds the stock and who makes the delivery. It is simply that **inventory** would be held in the most efficient place.

In sum, economies of scale can usually...

...could be more efficient. Further economies of scale can also be achieved by not duplicating **inventory** at the wholesaler and manufacturer: economies of scale are highest if the manufacturer holds **inventory** .

Using Predictability of Demand

Many existing supply chains are organized as if all demand were...service; it helped the electrical wholesaler introduce the minibar concept.

Different Configurations

The decoupling of **inventory** from contracting and making better use of information to improve predictability of demand and so...
...in many different ways. In Configuration A in Figure 4, called the "minibar concept", the **inventory** of products is kept at the installation site. This means that for these products, the...

...It is not a bad system, as the installer would not want to keep enough **inventory** on site to cover all these different items because of holding costs as well as...

...using a minibar concept, a trade-off is made between lower ordering costs and the **inventory** holding costs that the installer would not otherwise incur. We modeled the various costs pertaining...

...the customer to zero, which enabled the channel partners to capture various economies. A new **inventory** holding point had to be introduced into the chain. But this cost was outweighed by...

...This is particularly suitable for expensive products with irregular demand, when the cost of overall **inventories** (safety stock) can be greatly reduced if **inventories** are consolidated with the manufacturer rather than each wholesaler keeping these products on stock.

In...
...constitutes a significant fraction of the total costs of the electrical

installation of buildings. Currently, **inventory** is stocked both by the wholesaler and the manufacturer. But cost savings would be possible in the form of lower **inventory** and handling costs if only the manufacturer stocked the product. This would not prevent an...a medium-sized wholesaler. In this example, predictability of demand was used to relocate the **inventory** point for some orders. Fluorescent lighting fixtures come in many varieties, and in most installation...

...wholesalers (about equal shares). This meant that the factory, the importer and the wholesaler carried **inventory** . In addition, materials are stocked three times and transported three times before arriving at the...

...example, in the power cable supply both the manufacturer and the wholesaler had finished goods **inventory** , and both sold and delivered directly to installers. This prompted the companies to contemplate the... installer in order to understand where to order (with wholesaler or manufacturer), where to locate **inventory** (at wholesaler or manufacturer), and how to distribute. To build such a model, the necessary...

...but such information was not generally required. Where it was important, for instance for valuing **inventory** and calculating changes in **inventory** holding costs-rough estimates had to be used. However, even the exchange of what might...

...happens when a customer places an order. The order is initiated by the customer's **inventory** control system, and processed by the customer's purchasing system. However, the customer's receiving...parts of the supply chain become visible for a particular player. For example, if all **inventory** is to be held with the wholesaler, the manufacturer needs to know **inventory** levels, needs to tell the wholesaler what to delivery where on its behalf; and needs the wholesaler to report back. Similar information needs to be exchanged if all **inventory** is held with the manufacturer, or if some products are to be delivered directly for...

...teams of students and coaches. These teams were empowered to share cost information related to **inventories** , transportation, warehousing, and production set-ups, but commercial information about pricing and margins remained confidential...that the decision of which party executes a state is independent of which party holds **inventory** . Third, using predictability of demand helps to configure the supply chain in the best possible...

...in the entire previous year. At the same time, we have cut handling, ordering and **inventory** holding costs for stock-keeping items by more than 40%. Our relationships with partners in...

...1 (1997), pp. 1-13.

[3] Lee, Hau L. and Corey Billington, "Managing Supply Chain **Inventory** : Pitfalls and Opportunities," Sloan Management Review, (Spring 1992), pp. 65-73.

[41 Hoek, Remco van...

14/3,K/14 (Item 11 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01967565 40453263

Effect of correlated demands on safety stock centralization: Patterns of correlation versus degree of centralization
Das, Chandrasekhar; Tyagi, Rajesh
Journal of Business Logistics v20n1 PP: 205-213 1999
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 2285

DESCRIPTORS: **Inventory** management...
TEXT: The effect of **demand** correlations on **aggregate safety stock** was first studied by Zinn, Levy, and Bowersox, who introduced the notion of portfolio effect (PE) for measuring savings in **safety stock** by centralization of customer demand.' They described the influence of correlation magnitudes and signs on aggregate **safety stock** and suggested investigating the effects of partial and complete centralization in order to maximize the PE. Partial centralization refers to grouping **safety stocks** at more than one location. They further suggested that determining these groupings is a combinatorial...While it is commonly believed that complete centralization minimizes the cost of carrying safety stocks, **inventory** managers should be aware that greater benefits may accrue from partial centralization in some cases...centralization may, therefore, be reduced if distribution or order processing costs are significantly higher than **inventory** costs. Furthermore, non-cost factors, such as the marketing benefits of having an assortment of...

...the market.

NOTES

'W. Zinn, M. Levy and D. J. Bowersox, "Measuring the Effect of **Inventory** Centralization/ Decentralization on Aggregate Safety Stock: The 'Square Root Law' Revisited," Journal of Business Logistics...

...Location Newsboy Problem," Management Science 25 (1979): 498-501.

3W. J. Tallon, "The Impact of **Inventory** Centralization on Aggregate Safety Stock: The Variable Supply Lead Time Case," Journal of Business Logistics...

...the University of Northern Iowa. He is widely published in the areas of logistics management, **inventory** management and quality control.

Rajesh Tyagi is supply chain scientist at the General Electric Corporate...

14/3,K/15 (Item 12 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01967564 40453261
Vendor-managed inventory **in the retail supply chain**
Waller, Matt; Johnson, M Eric; Davis, Tom
Journal of Business Logistics v20n1 PP: 183-203 1999
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 5578

Vendor-managed inventory **in the retail supply chain**

...DESCRIPTORS: **Inventory** management
TEXT: Vendor-managed **inventory** (VMI) is one of the most widely discussed partnering initiatives for improving multi-firm supply chain efficiency.

Also known as continuous replenishment or supplier-managed **inventory** , it was popularized in the late 1980s by Wal-Mart and Procter & Gamble. VMI became...

...partnership, the supplier, usually the manufacturer but sometimes a reseller or distributor, makes the main **inventory** replenishment decisions for the consuming organization. This means the vendor monitors the buyer's **inventory** levels (physically or via electronic messaging) and makes periodic resupply decisions regarding order quantities, shipping...
...buyers relinquish control of key resupply decisions and sometimes even transfer financial responsibility for the **inventory** to the supplier (whether by the letter or spirit of their agreement). The arrangement transfers...

...VMI?

Success in supply chain management usually derives from understanding and managing the relationship between **inventory** cost and customer service level.2 The most attractive projects yield improvements along both dimensions...

...large orders from consuming organizations force manufacturers to maintain surplus capacity or excessive finished goods **inventory** , which are very expensive solutions, to ensure responsive customer service. VMI helps dampen the peaks and valleys of production, allowing smaller buffers of capacity and **inventory** .

Buyers are attracted because VMI resolves the dilemma of conflicting performance measures. End-of-month **inventory** level, for example, is a key performance measure for retail buyers, but customer service level...
...at the beginning of the month to ensure high levels of customer service, then let **inventory** drop at the end of the month to "meet" their **inventory** goals (disregarding the effect on service level measures). The adverse effect is even more pronounced...

...demand. The consuming organization benefits from legitimately lower cycle stocks, notjust low end-of-month **inventories** intended to mislead the reward system. Even if the buyer has surrendered ownership to the... more efficient route planning; for example, one dedicated truck can make multiple stops to replenish **inventories** for several nearby customers.

Improved Service

From the retailer's perspective, service is usually assessed...

...scope of available solutions to a given problem. For example, in times of critical shortage, **inventory** balancing across one customer's distribution centers (or even between customers) may be necessary. In...

...an option without VMI, for neither suppliers nor customers can see the widespread disposition of **inventory** . With VMI, stock balancing can be achieved when customers return product to the supplier, who...
...rollover to a replacement product can be facilitated by VMI. There would be less old **inventory** to flush through the system, so the customer can avoid drastic measures such as a...

...7 Interestingly, research has shown that EDI alone provides little improvement in warehouse stockouts or **inventory** levels but coupled with VMI has been found to be very effective.8 Various transaction sets are used to communicate the following: retailer warehouse withdrawals, retailer

warehouse on-hand **inventory** , supplier replenishment plans, and advance shipment notices.

For standardization, transaction sets known as Uniform Communication Standards (UCS) have been defined by the Uniform Code Council (UCC). Warehouse withdrawal and **inventory** information is transmitted via UCS 852 (product activity data). Supplier replenishment decisions are transmitted via...to replenishment. Each week the VMI manager can use the difference between the on-hand **inventory** in the retailer's distribution center, along with the target stock level, to make replenishment...

...true needs.

EVALUATING THE VMI APPROACH
To understand the effect of VMI on supply chain **inventories** , we evaluated a comprehensive set of scenarios as part of an investigation at Hewlett-Packard...

...concentrated on food and apparel industries.9 For example, Cachon and Fisher examined forecasting and **inventory** management under VMI for Campbell's Soup.lo Using simulations of their ordering rules, they found that both retailer and manufacturer's **inventories** could be reduced while improving service. They did not consider cases with limited manufacturing capacity and issues related to allocating **inventory** across retailers. In another study, Narayanan and Raman developed a simple analytic **inventory** model to examine the benefits of VMI when product demand is influenced by product availability...

...channel profits. Finally, a number of studies have established and characterized the value of centralizing **inventory** in a supply chain.'2 In our research, we examined the effect of VMI in...

...all DCs is normally distributed, with the relative variability being another point of our analysis.

Inventories at each DC were adjusted to achieve a 90 percent item fill rate in each...

...The boxed area in the figure indicates our scope of interest. We tracked demand and **inventory** at the manufacturer's DC and at the retailer DC; we omitted third-party DC or store-level **inventory** from the analysis since we were concentrating on VMI at the first-tier DC level...

...major customers. Ordinarily, retailer DCs placed orders every one, two, or four weeks to restore **inventory** to the target level (one delivery per order). With our model of VMI, by contrast...

...Effect of Demand Variability

To understand uncertainties that have the greatest influence on supply chain **inventories** , we first examined how variability of demand affects the benefits achieved with VMI. For each...5), to high (1.0).

Figure 2 shows, for all seven large customers, the average **inventory** required to ensure 90 percent fill rate at each DC. Notice that the **inventory** reductions were very large (greater than 85 percent) for all three levels of demand variability...
...heavy demand days, it may be possible to ship two or more full truckloads.

While **inventory** reductions were expected for participating customers, an unexpected side effect is shown in Figure 3. There were significant **inventory** reductions at the distribution center supporting only non-VMI customers. Bringing customers into the VMI...

...reliable supplier to all its customers. (Detailed results shown in Table Al indicate that the **inventory** reductions are statistically significant.)

In figures 2 and 3, **inventory** reductions are similar for all three demand variability cases. In figures 5 and 6, we see the relative **inventory** reduction for major retailer DCs and for the manufacturer's DC (**inventory** requirements are a percentage of four-week requirements). In every case, the largest reductions occur...

...demand variability cases. With VMI, retailers required only about S to 15 percent of the **inventory** needed for a four-week order cycle. Lower variability cases showed greater relative reduction because...

...same for both high and low variability cases; these reductions constitute most of the savings (**safety stock** is a small portion of the **total inventory**). Likewise, the **manufacturer** 's own DC (which supports only non-VMI customers) was able to reduce **inventory** to only 20 percent of four-week requirements. Again, the greatest reduction occurred in low variability cases, since improving manufacturing delivery performance for these cases nearly eliminated the need for **safety stock** (cycle **stock** is not affected because the manufacturer's DC places daily orders). Reductions for medium and...

...analysis, we assumed medium demand variability. See Table A2 for detailed results.

Figure 7 plots **inventory** of major retailers at the three adoption levels. When major retailers constitute 60 percent of total daily demand, they require more **inventory** than when they constitute only 15 percent, which comes as no surprise. But Figure 8...

...60 percent of the demand and operate under the traditional four-week ordering policy, the **inventory** requirements for the manufacturer are higher than when the manufacturer's DC services 85 percent...

...the major retailers are large and batch their orders, it creates chaos in manufacturing. More **inventory** is required to protect against uncertainty associated with the factory's ability to deliver on demand.

Figure 10 shows the relative **inventory** requirement with changing order frequency. The key lesson from this analysis is that the benefits...Limited Manufacturing Capacity

Our last set of scenarios involves the relationship between manufacturing capacity and **inventory** requirements. Like **inventory** , excess capacity represents a buffer against demand uncertainty. As capacity utilization increases, therefore, one would expect more **inventory** to be required (hence trading one buffer for another).

FIGURE 7

FIGURE 8

FIGURE 9...

...results are presented in Table A3.

Figure 11 shows that with higher plant utilization, the **inventory** requirements of the major retailer DCs actually increase slightly under any replenishment plan. Because the major customers are given priority at the manufacturing plant, the increased **inventory** needs are small.

Figure 12 reveals that the manufacturer's DC pays the price for reducing excess capacity at the factory. As plant utilization increases, requirements for **inventory** at this DC increase, with the largest jump occurring as utilization climbs above 90 percent. This figure also reveals another hidden benefit of VMI. With VMI, **inventory** requirements change very little until plant utilization becomes high. In fact, **inventory** needs at utilization levels of 75 to 90 percent are nearly identical, while with four-week review periods, **inventory** levels increase steadily with higher plant utilization. The lesson is that VMI is even more...

...VMI allows the manufacturer to diminish excess capacity and achieve high production efficiencies without increasing **inventory** or reducing order fulfillment objectives.

CONCLUSION

The management of **inventory** by the supplier continues to draw attention in many industries. We have addressed the benefits...
...the availability of Internet EDI software. 7 Our analysis shows that the approach greatly reduces **inventories** for all participants in the arrangement, without compromising service. Moreover, there is a surprising "trickle...

...non-VMI customers of a manufacturer.

FIGURE 10

FIGURE 11

FIGURE 12

Most of the **inventory** reduction achieved with VMI can be attributed to the more frequent **inventory** reviews, order intervals, and deliveries that characterize this approach. Opportunities for greater coordination of these ...

...47.

3Gerard Cachon and Marshall Fisher, "Campbell Soup's Continuous Replenishment Program: Evaluation and Enhanced **Inventory** Decision Rules," Production and Operations Management, 6, no. 3 (1997): 266-276.

4For example, see...1997): 93-102.

6J. R. Carter, "The Dollars and Sense of Electronic Data Interchange," Production & **Inventory** Management, 31, no. 2 (1990): 22-26.

7Harvard Business School Case, "Frito-Lay: The Backhaul...

...Business School, Cambridge, MA.

12W. Zinn, M. Levy, and D. Bowersox, "Measuring the Effect of **Inventory** Centralization/ Decentralization on Aggregate Safety Stock: The Square Root

Law Revisited," Journal of Business

Logistics, 10, no. 1 (1989): 1-13, W. J. Tallon, "The Impact of **Inventory** Centralization on Aggregate Safety Stock: The Variable Supply Leadtime Case," Journal of Business Logistics, 14, no. 1 (1993): 185-203, and Franco Caron and Gino Marchet, "The Impact of **Inventory** Centralization/ Decentralization on Safety Stock for Two-Echelon Systems," Journal of Business Logistics, 17, no...
...is conducting research in supply chain logistics, including manufacturing capacity planning, transportation system design, and **inventory** measurement and control. His articles have appeared in such journals as Management Science, Operations Research...

14/3,K/16 (Item 13 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01899434 05-50426
Statistical process control and selectable forecast calendars reduce GE aircraft engines' parts inventory
Beck, Jeff
Production & Inventory Management Journal v40n3 PP: 62-69 Third Quarter 1999
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 2687

Statistical process control and selectable forecast calendars reduce GE aircraft engines' parts inventory

...DESCRIPTORS: **Inventory** management

ABSTRACT: How GE was able to reduce its planning staff levels and cut its spare parts **inventory** significantly while maintaining high service levels in the highly competitive airline industry is demonstrated. These...
...TEXT: General Electric used selectable forecast calendars and statistical process control to reduce its spare parts **inventory** by 25%. Even more impressive is the fact that **inventory** was reduced while service levels were maintained and planning staff was cut by 30%.

Pressures in the increasingly competitive airline industry forced GE to reduce **inventories** and produce more with fewer people while maintaining customer service. Statistical process control (SPC) and...

...The service parts operation supplies parts for GE Aircraft Engines' commercial jet engines from an **inventory** of 8000 parts. When the project began in 1992, the group had 12 **inventory** planners, each of whom handled a variety of parts, whose cost ranged from one dollar...

...forecast errors, and made no provision for seasonal variations. Compounding the problems, individual planners set **inventory** levels and service inconsistently

When widely publicized airline industry problems forced GE Aircraft Engines to reduce costs, **inventory** planners were cut from 12 to 8. At the same time, the company was urged to reduce its service parts **inventory** . The existing **inventory** planning process was incapable of solving the problems. Clearly, a different approach was needed to reduce **inventory** and costs while maintaining competitive service to customers.

ORGANIZING FOR CHANGE

GE began its search...

...volumes of parts, could not automate the forecasting process, failed to integrate the forecasting and **inventory** planning processes, and did not deal well with the lumpy demand items that compose the...

...of standard and specialized SPC techniques to manage the 95% of GE Aircraft Engines' parts **inventory** for which they were responsible.

In 1992 the company installed the Finished Goods Series (FGS...

...Software Inc. of Tieton, Washington. FGS is a flexible PC-based integrated demand forecasting and **inventory** planning package that handles large volumes of parts and is designed to exchange information with...

...in the group, GE divided the parts into separate A, B, and C databases by **inventory** class, rather than by engine section as they had previously. A fourth database was created...

...other five planners). This was referred to as the A+ database.

This organization allowed each **inventory** planner to work independently, while preserving the ability to combine the databases in a summary... calendar, needs only 51% of the safety stock, compared to the monthly calendar-a 49% **inventory** savings. The models of bimonthly and monthly calendars are marked "high error," indicating that the unadjusted standard deviation is greater than the level.

In simulation mode, the impact on the **inventory** of each forecasting decision can be considered before committing to it. The usual alternative is...

...permits.

HIGH TOTAL STOCK REPORT

The high total stock report catches parts with a planned **inventory** in excess of a year's **demand** by comparing the **total safety stock** and working stock. At GE Aircraft Engines, many parts are replenished infrequently If a part...

...the working stock alone buys enough customer service to reach the service target without any **safety stock** .

Table 4 shows a high total stock report with a oneyear control limit. Many items with annual usage of one and safety stock of one create a large, slow-moving **inventory** (in pieces, if not in dollars). The report is sorted in descending order by planned **inventory** dollars but could be sorted by days. Each is valuable for identifying parts that merit...

...CONCLUSIONS

During the three-year period from 1992, when GE installed FGS software, to 1995, **inventory** was reduced by 25%. At the same time, GE held customer service levels constant or...

...acting on that need.

ACKNOWLEDGMENTS

I would like to thank John R. DiPaola, manager of **inventory** management, and Ron F. Baker, director of spares operation, without whom this project could not...

...in Americus, Georgia. At the time of this writing, he was team leader in forecasting/ **inventory** planning for commercial spare parts at GE Aircraft Engines. He is responsible for approximately 8,000 part numbers for both **inventory** level and customer service, working for more than five years as a forecasting/ **inventory** planner and as team leader for more than two years. Mr. Beck has an MBA...

14/3,K/17 (Item 14 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01899429 05-50421
Impact of forecasting on demand planning
Tanwari, Anwar Uddin; Betts, James
Production & Inventory Management Journal v40n3 PP: 31-35 Third Quarter 1999
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 3194

...TEXT: variances in demand by its customers, the company has always been compelled to hold large **inventories** to ensure that its customers' demands are met with a high level of service. However...

...several reasons, Cussons's supply and demand frequently differ, leading to the need to hold **inventory** in reserve, or safety stock, to protect against those uncertainties. The company also needs safety...

...holding costs increase. For the Middle East market, Cussons's lead time is high, so **inventory** is replenished infrequently. In fact the time lapse between Cussons getting an order from the...described in this article. The output of the forecasting models together with the statistically determined **safety stock** becomes the input of the finite capacity production planning software. In turn, the output of...

...a British-based company, Minerva Industrial Systems Limited. It offers a fully integrated approach to **total supply** chain management, including manufacturing, distribution, field service, and financial applications.

The mechanism by which order...

...by wholesalers changing aggregated orders from retailers in accordance with what the wholesalers had in **inventory** and/or their anticipation of future demand. Effectively, the aggregated data being received by Cussons ...

...into account, these errors can be the cause of poor planning, which leads to huge **inventories** or stockouts. However, past differences in actual and expected demand can be measured and these...

...based on warehouse movements rather than the more variable order pattern, a significant reduction in **inventory** can be expected. This implies that Cussons examine how it can meet demand using warehouse...

...Many of these pilgrims stay for more than one month, and local retailers build up **inventories** beforehand to meet the increased demand.

Another factor to consider is the length of the...using models based on warehouse movement data it ought to be possible to considerably reduce **inventories** in the Middle East supply chain of Cussons's products. By using information about Islamic events, further reduction in **inventories** can be expected. Information about the occurrence of Muslim festivals can be used in the...

...Furthermore, information about the time of Islamic events should be used to help reduce the **inventory** by significant amounts and to manage the **inventory** at times of high demand.

Progressive companies are beginning to adopt a numerate approach to...

14/3,K/18 (Item 15 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01899426 05-50418
Pack to order: An antidote for brand multiplicity
Krupp, James A G
Production & Inventory Management Journal v40n3 PP: 16-20 Third Quarter 1999
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 2485

DESCRIPTORS: **Inventory** management...

ABSTRACT: Brand multiplicity presents a significant challenge to distribution environments in achieving optimal balance between **inventory** and service. Pack to order systems provide opportunities to reduce **inventory** investment and increase flexibility and service. At the same time, the potential for increased operating costs must be considered. Three options for achieving reduced **inventory** investment and improved flexibility in **inventory** management are presented. Each has its advantages and caveats, and no value judgment has been...
TEXT: One of the greatest challenges to minimizing **inventory** levels while maximizing customer service may be products packaged in multiple brand packaging, a problem sometimes referred to as brand multiplicity. To counteract the paradox of optimizing **inventory** investment and service levels, a number of companies have turned to pack to order (PTO...

...advantages of such an approach. There are several factors to consider.

Brand multiplicity requires redundant **inventory** of the same base product when **inventory** is held at the highest level, that is, at the individual SKU. That requirement creates significant exposure to imbalanced **inventories** . The exposure becomes even more dramatic when **inventory** is held at the SKUL (SKU by location) in multipoint distribution environments. In addition to...

...statistical safety stock techniques are used because of the reduced demand variability previously mentioned. Overall **inventory** cost is also reduced when **inventory** is carried at a bulk level, as it is held below the packaged "value added...

...versions increases.

The results of this analysis point to the fact that planning and maintaining **inventory** at a consolidated master part number level, with individual customer orders packed only as required, will have no impact on the baseline **inventory** to support customer demand (i.e., the **inventory** level based solely on demand, with no safety stock factored in). It is possible, however...at the bulk level may provide more stable and reliable forecasts, with consequent impact on **inventory** . But if safety stock is based on statistical variability (e.g., MAD, mean absolute percentage...

...strategy that entails maintaining product in bulk and packing to customer requirement, versus maintaining full **inventories** at each SKU level, provides an opportunity to reduce **inventory** investment while maintaining customer service. In addition, increased flexibility to accommodate demand swings between pack...

...number and required packaging and labels. The concept has the advantage of maintaining semifinished goods **inventory** at its lowest common denominators and thus minimizes **inventory** investment in safety stock while maximizing flexibility to meet customer demands. There are drawbacks, however...

...increased cost of operation is justified by the reduction in costs entailed in the reduced **inventory** levels. But there is a qualitative factor that must also be considered-improved service to...

...customer orders are first checked against available SKU stock for allocation. If there is insufficient **inventory** at this level, then the balance is treated as a pack to order situation. The...

...pack versions with predictable baseline demand can be packed in advance of peak demand periods. **Safety stock** , demand variability coverage, and **inventory** to support low-volume pack versions continue to be carried in bulk form. Consider as an example a bulk part number with **total** monthly **demand** of 10,000 units and 8 pack versions. Table 3 indicates peak and low demand...

...packing a portion of the demand in longer packaging runs. At the same time, holding **inventory** in bulk beyond absolute minimum certainty levels continues to optimize flexibility.

Salable product returned by...

...lost packaging material.
Such a system provides the highest level of flexibility while maintaining low **inventory** investment, and provides some degree of advantage in economy of scale and labor load leveling...of scale benefit is self-apparent. The drawback is exposure to a possible reduction in **inventory** flexibility, with a slight potential that the right product may be on the shelf in...

...of packing orders can be realized. The trade-off is the potential for slightly increased **inventories** over what could be achieved in a pure pack to order system, and the limited exposure to reduced flexibility and imbalanced **inventories** .

CONCLUSION

Brand multiplicity presents a significant challenge to distribution environments in achieving optimal balance between **inventory** and service. Pack to order systems provide opportunities to reduce **inventory**

investment and increase flexibility and service. At the same time, the potential for increased operating costs must be considered. This article has presented three options for achieving reduced **inventory** investment and improved flexibility in **inventory** management. Each has its advantages and caveats, and no value judgment has been made as...
...Stanley Tools, and Sargent & Co.

His numerous articles have appeared in APICS-The Performance Advantage, **Inventories** and Production Magazine, Journal of Business Forecasting, Journal of Purchasing & Materials Management, Management Accounting, P&IM Review & APICS News, and Production & **Inventory** Management Journal. He has also contributed numerous

Author Affiliation:

book reviews to this journal. Mr. Krupp is a cowinner of the 1978 APICS Production & **Inventory** Management Journal Award, and winner of the 1998 Romey Everdell Award. He serves as a member of the Editorial Review Board for the Production S **Inventory** Management Journal.

Mr. Krupp is a member of the New Haven chapter of APICS and...

14/3,K/19 (Item 16 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01888690 05-39682
Passive money, active money, and monetary policy
Laidler, David
Bank of Canada Review PP: 15-25 Summer 1999
ISSN: 0045-1460 JRNL CODE: BCA
WORD COUNT: 8094

...TEXT: of durable goods grows, as does that of firms to finance, say, an increase in **inventories** . These are the effects, not of changes in their demand for money, but in their...

...to be held at each and every moment, but rather the target value of an **inventory** -sometimes termed a **buffer stock** -the actual value of which will fluctuate around ...at the level of the economy as a whole. An increase (or decrease) in the **aggregate** money **supply** , not initially matched by a change in agents' target money holdings, is just such a...

...the proceeds, and it seems impossible to generalize here. A firm selling consumer durables, whose **inventories** and degree of bank indebtedness are both initially too high for comfort, will presumably devote an inflow of cash resulting from the sale of some item out of **inventory** to reducing that indebtedness. Newly created money will, in this case, quickly disappear from circulation. If that firm initially has equilibrium levels of **inventories** and indebtedness, the cash inflow might instead be spent on replacing the item sold and...

...along the transactions chain. Or again, if the firm is willing to tolerate a lower **inventory** for awhile, but feels comfortable with its level of bank debt, its newly acquired cash...they first set it out.

Footnote:

7. Indeed, the widely taught Baumol (1952)-Tobin (1956) **inventory**

-theoretic model of the demand for money embodies just such effects. In Ss inventorytheoretic models...Canada Review (Spring): 5-18.

Baumol, W. J. 1952. "The Transactions Demand for Cash: An **Inventory** Theoretic Approach." Quarterly Journal of Economics 66: 545-56.

Boessenkool, K., D. Laidler, and W...

...Bank of Canada, May 1990. Ottawa: Bank of Canada.
Davidson, J. and J. Ireland. 1990. " **Buffer Stocks** , Credit, and **Aggregation** Effects in the **Demand** for Broad Money: Theory and an Application to the U.K. Personal Sector." Journal of...

14/3,K/20 (Item 17 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01870617 05-21609
Closing the logistics loop: A tutorial
Lawrence, F Barry
Production & Inventory Management Journal v40n1 PP: 43-51 First Quarter 1999
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 5041

...DESCRIPTORS: **Inventory** control

...ABSTRACT: as a loop from customer service levels (fill rates), to forecasting, to purchasing decisions, through **inventory** control, back to customer service. The loop runs off information, which is traded for **inventory** . As a key component of the supply chain, the logistics process is examined to eliminate...
...TEXT: their role increasing in importance as manufacturers have come to rely on them as the **inventory** specialists. A fluid power distributor initiated this study to develop a logistics model for its...

...tools are brought to bear, but the most significant ones to logistics companies are the **inventory** control initiatives. Traditional systems are being augmented by advanced technology, leading to real-time visibility throughout the chain. Real-time visibility means that at any time we can identify where **inventory** is in the channel, its level, what customer it is promised to, what shelf (bin...

...times and lead-time variability are highly significant.

THE LOGISTICS LOOP

The logistics system carries **inventory** to the customer through a forward loop that relies on a backward information loop as...

...The forecast drives the purchasing decision (lot size) which, after forecasting error, will determine the **inventory** levels. **Inventory** status will ultimately determine the customer service level (fill rate). Management decides what service level...

...amount of customer demand the company will try to serve. Once the decision is made, **inventory** needs are determined and forecasts to meet those needs are developed again. The cycle repeats...

...not monitored for continuous improvement, the company will have a difficult time understanding system performance. **Inventory** will inexplicably increase for some products, while others will be chronically out of stock. The...

...on information, and the key point to remember is that information can be traded for **inventory** .

Managerial policies and the availability of information for decision making are the keys to the...

...tend to overreact to recent developments and overbuy or overforecast, which leads to large dead **inventories** . Large, slow-moving **inventories** will cause shortages in faster-moving items because of financial or physical constraints. Human judgment...of this magnitude would mean. A forecast error averaging a certain amount could mean excessive **inventories** if the forecast was consistently overforecasting or serious stockouts if it was underforecasting. For the...

...must be adjusted. A forecast that demonstrates a bias will lead to stockouts or excessive **inventories** .

MAPE puts errors in perspective by taking the error as a percentage of the underlying...

...to buy. The number bought, commonly called the lot size, has a direct relationship with **inventory** levels. Generally speaking, the larger the lot sizes, on average, the larger the firm's **inventory** levels. **Inventory** control programs, like those in Just-in-Time and theory of constraints, are based on...customer service. We cannot, however, drive the fill rate to 100% in most cases since **inventory** costs would become prohibitive. Figure 3 demonstrates the relationship between fill rate and **inventory** . At some point, higher levels of fill rates would make a company less competitive on ...

...is demand times lead time or demand during lead time. Obviously we will need sufficient **inventory** to cover us during the supplier's average or stated lead-time period (depending on...
...policy as to what lead time we will respect). The impact of lead time on **inventory** levels is clear here. If lead time is four weeks we must have four weeks' worth of demand at reorder. If it goes to 12 weeks, the necessary **inventory** triples. This portion of the formula calls for shorter supplier lead times.

The second portion of the formula is safety stock. Safety stock is the worst form of **inventory** since, statistically speaking, it never leaves our facility. Sometimes we use our safety stock, but...

...equally as likely not to use the safety stock and not use the entire regular **inventory** . The net effect is that on average we maintain the safety stock year-round.

The...

...as much in holding costs as regular stock (see the total cost equation). A major **inventory** goal, therefore, is to hold safety stocks to a minimum. Because of the complicated relationships...

...demand variability, when people try to estimate safety stock without using statistical means either excessive **inventory** or stockouts are

frequently the outcome.

Once management has established a desired service level expressed...

...number of factors. Lead time frequently has the largest impact on the ROP and hence **inventory** status. We must, therefore, find innovative methods-technological, managerial, or otherwise-to reduce both the...

...carries many products, the potential order combinations are tremendous. A definite solution and, hence, proper **inventory** status is probably impossible to obtain and would be an extremely expensive policy if found... is the total cost of processing orders. Q is the EOQ, and if we divide **total demand** by Q we get the number of orders placed this year. The second set of numbers is the cost of holding average (not **safety stock**) **inventory** . The EOQ divided by 2 is average **inventory** (see Ballou [1] for an explanation of the relationship between regular and **safety stock**). The next set is the cost of holding **safety stock** . The final portion is the cost of stockouts. Breaking the numbers down, we get the...

...service level (95%).

HOW TO IMPROVE THE SYSTEM

The logistics loop is now complete. The **inventory** will be depleted; holding costs and, unfortunately, some stockouts will be incurred. Management will decide...As time windows continue to narrow, it will be essential for any firm dealing in **inventory** to do the same. The leaders in technology will take risks and pay for them...

...rear, on the other hand, will probably fail if they don't have a coherent **inventory** plan to deal with the changing market.

The advantages to shorter lead times are numerous. The **inventory** savings have already been demonstrated, but the additional benefits of a tighter-running system also...

...shorterterm forecasts. The shorter a forecast term, the more accurate it becomes, leading to additional **inventory** savings resulting from reductions in the variability used in safety stock calculations.

Reference:

REFERENCES

Reference...
...Minn.: West Publishing, 1995.

5. Sanders, N. "Measuring Forecast Accuracy: Some Practical Suggestions." Production and **Inventory** Management Journal 38, no.1 (1997): 43-46.

Author Affiliation:

F. BARRY LAWRENCE

Industrial Distribution...areas of interest include logistics and supply chain

Author Affiliation:

management and specific issues involving **inventory** and information systems. He has conducted extensive industry studies in the areas of

integrated supply...

...automation and layout for electronics distribution, warehouse and transportation logistics for electrical distribution, warehouse/transportation/ **inventory** management/customer service for steel distribution, and distribution information systems.

14/3,K/21 (Item 18 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01827339 04-78330
The value
Anonymous
Chief Executive Guide to Enterprise Business Solutions Supplement PP: 31-32 1999
ISSN: 0160-4724 JRNL CODE: CHE
WORD COUNT: 845

...TEXT: include everything from adding Internet capabilities onto HR or procurement functions to leveraging the new " **total** view" of the **supply** chain to cut excessive **safety** **stocks** from **inventory** .

But the greatest value of an EBS will come over the long term-if CEOs...

14/3,K/22 (Item 19 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01827326 04-78317
The plan
Anonymous
Chief Executive Guide to Enterprise Business Solutions Supplement PP: 11-13+ 1999
ISSN: 0160-4724 JRNL CODE: CHE
WORD COUNT: 8778

...TEXT: tool and an add-on to R/3. The focus will be on vendor-managed **inventory** and demand planning, says Morgan. "There is a big difference in the perception of this...include everything from adding Internet capabilities onto HR or procurement functions to leveraging the new " **total** view" of the **supply** chain to cut excessive **safety** **stocks** from **inventory** .

But the greatest value of an EBS will come over the long term-if CEOs...

14/3,K/23 (Item 20 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01777581 04-28572
Supply chain optimization
Olsen, Robert L
Molding Systems v57n2 PP: 56 Feb 1999
ISSN: 0032-1273 JRNL CODE: PLW
WORD COUNT: 734

...TEXT: stocking levels, and costs. A recent report, however, found that the number of days of **inventory** in the supply chain for the grocery industry-a leader in supply chain management-has...

...to allow for optimization of its core competence. Gone would be the error factors and **inventory** fluff created by forecast systems working with dated data. Gone would be the guesswork of...

...meaningful business data. Gone would be a significant surplus that is being held in the **total supply** chain, from raw materials to work-in-progress to **buffer stock** in the warehouse.

The resulting evolution will be a true synthesis of the supply chain...

14/3,K/24 (Item 21 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01728532 03-79522
Supply chain postponement and speculation strategies: How to choose the right strategy
Pagh, Janus D; Cooper, Martha C
Journal of Business Logistics v19n2 PP: 13-33 1998
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 6270

...TEXT: point.10 The notion of logistics11 postponement is to maintain a full-line of anticipatory **inventory** at one or a few strategic locations.12 This means to postpone changes in **inventory** location downstream in the supply chain to the latest possible point.13

Two key and...

...is speculation, which holds that changes in form, and the movement of goods to forward **inventories** , should be made at the earliest possible time to reduce the costs of the supply...

...speculation strategy
This strategy is traditionally the most often used by companies.18 Based on **inventory** forecasts, full speculation of all manufacturing and logistics operations is practiced. The retailer/customer order...both manufactured and distributed in large lot-sizes.20 As a result of the decentralized **inventories** , the **inventory** investment will be high, the highest of all four of the P/S-strategies. Further...

...to the final manufacturing operations. The first stages of the manufacturing process are centralized and **inventory** initiated. This strategy could also be named the post-factory manufacturing strategy, as described by...

...manufacturing operations, manufacturing cost has increased slightly, but the number of SKU's and the **safety stock** have dropped. Furthermore, the **total manufacturing** , shipping and **inventory** costs were reduced by 25%.25

The manufacturing postponement strategy can be successfully applied when it is vital to have **inventories** close to customers, and to the extent that no specialized manufacturing capabilities (e.g. technological...

...reduced," while providing a full assortment. Further, the effect is a reduced total value of **inventory** and a simplification of the **inventory** planning and management. On the other hand, the costs and complexity of customer order processing...

...postponement. This is carried out by direct distribution of fully finalized products from a centralized **inventory** to final retailers/customers. Figure 4 illustrates that the retailer/customer order point has been moved upstream to the plant or central warehouse level. All manufacturing operations are **inventory** initiated, and performed prior to the logistics operations. The logistics operations are purely customer order...

...in increased on-time deliveries of complete orders, shorter and more reliable lead-times, reduced **inventory** costs, constant transportation costs, and faster introduction of new products in the assortment.

By employing...

...reduced or completely eliminated, since products are distributed directly to retailers/customers. The centralization of **inventories** reduces the amount of stock required to offer high in-stock availability,33 but shipment...Before changing to this strategy, B&O employed the full speculation strategy, resulting in high **inventory** levels and a slow-response delivering process. Another example is Xerox's fully customized and...

...received customer orders.35

The result from employing the full postponement strategy is low manufacturing **inventory** costs and reduction of **inventories** in the distribution system. Economies of scale will probably only exist in the anticipated stages...Journal of Logistics Management, 4:2 (1993), pp. 75-83.

33David H. Maister, "Centralization of **inventories** and the - Square Root Low," International Journal of Physical Distribution, 6:3 (1976), pp. 124 ...are similar to the concept of flow models described by Theodore M. Farris II, "Utilizing **Inventory** Flow Models with Suppliers," Journal of Business Logistics, 17:1 (1996), pp. 35-62.

44Same...

14/3,K/25 (Item 22 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01634389 02-85378
Introducing APS: Getting Production in Lock Step with Customer Demand
Gould, Lawrence S
Automotive Manufacturing & Production v110n5 PP: 54-58 May 1998
ISSN: 1086-9298 JRNL CODE: PRD
WORD COUNT: 2023

...ABSTRACT: to dynamically synchronize customer demand to the very real constraints on the production floor - typically **inventory** , machine capacity and people - against a backdrop of business and production rules. APS can synchronized...
...TEXT: attempts to dynamically synchronize customer demand to the very

.real constraints on the production floortypically **inventory** , machine capacity, and people-against a backdrop of business and production rules. Because of changes...

...top of MRP called the master production schedule (MPS). MPS marked the end of ordering **inventory** based on past usage. Instead, MPS focused on sales and marketing's best guess of...

...and products have the same priority. MRP can't differentiate customer orders from orders for **safety stock** and forecasted orders. Generally, MRP just **aggregates demand** (customer orders) into lots and outputs a bunch of numbers that essentially say "make all...and flagging potential delays in existing orders.

Build-to-stock: APS significantly reduces finished goods **inventory** by reducing production cycle time and, more than other scheduling techniques, by reacting faster to...

...Static data are typically build data, including BOMs, process routings, cycle times, setup penalties, and **inventory** levels. These data are automatically updated periodically through file transfer from other systems. Dynamic data...

...associated tooling, their setup and maintenance requirements, operating capacities, maintenance, and setup and calibration specifications

Inventory , including raw materials, work-in-process, and finished product availability and sequencing

Transportation, including warehousing...

14/3,K/26 (Item 23 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)

01544950 01-95938
Do inventories **moderate fluctuations in output?**
Allen, Donald S
Federal Reserve Bank of St. Louis Review v79n4 PP: 39-50 Jul/Aug 1997
ISSN: 0014-9187 JRNL CODE: FSL
WORD COUNT: 4231

Do inventories **moderate fluctuations in output?**

...DESCRIPTORS: Buffer **inventories** ;

ABSTRACT: **Inventories** are widely believed to serve as a buffer stock against unexpected fluctuations in demand, allowing...

...production more efficiently. If so, one would expect production to vary less than sales and **inventory** to move in the opposite direction to sales. However, research finds that production varies more than sales and that there is a positive correlation between changes in **inventory** and changes in sales. These findings imply that **inventories** are not being used to smooth production and do not serve as a buffer for uncertain demand. It is found that firms may use **inventories** to smooth production, but only partially. ...

TEXT: The movement of aggregate **inventory** investment appears to play a major role in business-cycle dynamics. Economists continue to explore the

idea that large unexpected slowdowns in demand may cause an excessive amount of **inventory** to build up, causing a slowdown in output as firms cut back on production until **inventories** return to normal. A previous article in this publication (Allen, 1995) discusses the potential impact of changing **inventory** management methods on the frequency and depth of recessions. Although the findings are inconclusive, the potential effect of **inventory** movement on the business cycle warrants continued research. In addition, some authors argue that monetary policy has its primary impact through an effect on **inventory** investment. If this is the case, then it is important for monetary policymakers to understand how the decisions on **inventory** investment-that is, periodic changes in **inventory** -are made.

In spite of the large amount of research on **inventories** , many questions remain. This article tries to answer two of several open questions identified by Lovell (1994): First, do firms use **inventories** to schedule production efficiently? Specifically, do firms use **inventories** to smooth production in the face of uncertain demand? Second, are problems of aggregation important...

...directly, do problems of aggregation account for economists' failure to confirm smoothing by analyzing aggregate **inventory** data?

Inventories allow firms to supply unexpected demand without having to adjust output immediately When firms face increasing marginal costs of production, using **inventory** to smooth production is efficient, as long as the savings from not adjusting production exceed the cost of holding **inventory** . **Inventory** acts as a buffer stock, absorbing increases or decreases in demand while production remains relatively...

...than production: The variance of production should be less than the variance of sales. If **inventories** are used as a buffer stock, then high-frequency changes in **inventory** should be in the opposite direction to sales. Empirical research using aggregate data does not confirm this intuition. **Inventory** researchers (Blinder, 1986, for example) have found that production varies more than sales and that the covariance of changes in **inventory** and sales is actually positive. These stylized facts imply that either the production-smoothing, buffer...

...of the research that finds contradictions of production smoothing uses seasonally adjusted aggregate data of **inventory** and sales. It is possible that firms actually do use **inventory** to smooth production and that the empirical research has failed to detect the signs of...
...failure of the production-smoothing test is that firms also consider other factors in managing **inventory** If there are severe economic penalties for running out of stock, then firms may plan to maintain some average level of **inventory** relative to sales over a planning horizon (see West, 1986). If increasing demand or large shocks to sales reduce **inventory** below this level, then a portion of production will be used to increase **inventory** . If this "planned" addition to **inventory** is large enough, the variance ratio test for smoothing will fail. A test of a model in which firms smooth around a target **inventory** -to-sales (VS) ratio appears to support the buffer-stock nature of **inventories** .

The paper is organized as follows: The first section gives a description of the data...

...smoothing hypothesis. The third section proposes a simple model of partial adjustment to a target **inventory** level. It shows the results of tests of the buffer-stock hypothesis using the correlation of changes in **inventory** to changes in sales at the firm level and SIC code level. Next,

some specific...

...summary and conclusions follow.
DESCRIPTION OF DATA

The COMPUSTAT data are individual firm data on **inventory** and sales for publicly traded firms for the period from the first quarter of 1981...

...quarters. Duplicate companies, companies with nonconsecutive quarters, and SIC codes for which the notion of **inventory** did not correspond to the product offered for sale-for example, services-were eliminated. The...1 billion in SIC code 29 (petroleum and coal products). The ratios of mean quarterly **inventory** to mean quarterly sales range from 0.17 to 1.38. This range compares to a peak monthly **inventory** -to-sales ratio for total business of 1.7 during the 1981-82 recession and 1.36 in April 1997. A 1.36 ratio of **inventory** to monthly sales is approximately equivalent to 0.46 as a ratio of quarterly sales...

...firms within SIC codes is performed separately for changes and levels. That is, sales and **inventory** are summed over firms within the same 2-digit SIC code, but changes in sales and/or **inventory** for the SIC code are computed by adding the changes in sales and/or **inventory** for each company in the sample during the quarter instead of taking the difference of the aggregate sales and/or **inventory** . Firms are included in the sample after the second period for which data are available...
...be the sum of the value of sales and the value of the change in **inventory** for each quarter.

RESULTS

Variance Ratio

The typical measure of smoothing uses the ratio of...

...and sectoral interaction between companies-that is, manufacturing firms, wholesale firms, and retailers all hold **inventory** and can be suppliers or customers of each other. **Inventory** movements of each sector can be offsetting or synchronized. Summing **inventory** over all firms, both downstream and within the same sector, can distort the variance ratios...

...The value of production is estimated as the sum of sales and the change in **inventory** for that period, as shown in Equation 1 below: (Formula Omitted)

where P is production, X is sales, and N is **inventory** . The variance of the value of production is then equal to the sum of the variance of sales, the variance of the change in **inventory** , and twice the covariance of sales and the change in **inventory** . Therefore, for the variance of production to be less than the variance of sales, the...

...be negative and more than half the value of the variance of the change in **inventory** .

The last column in Table 1 shows the sign of the covariance of sales and changes in **inventory** for the aggregate of the 2-digit SIC codes. There are 10 industries in which the covariance of sales and the change in **inventory** are negative, but in seven of these the negative covariance is less than half the variance of the change in **inventories** , leading to a variance ratio greater than 1.0.

Estimating production by adding sales revenue to changes in **inventory** each quarter instead of counting actual physical stock generally has had less success in confirming...

...ratio test's failure to confirm smoothing is that firms may attempt to maintain average **inventory** at a fixed proportion of average sales, so that if sales are trending up, then **inventory** will also trend up.3 West (1986) and others recognized that when firms maintain **inventory** for stockout avoidance, production smoothing will not be confirmed in the data. In this case a portion of **inventory** change ("planned **inventory** changes") will move together with sales, while a portion of **inventory** change ("unplanned **inventory** changes") will move in the opposite direction to sales as a buffer stock. Since production is computed as the sum of sales and the contribution to (change in) **inventory** each period, if the planned **inventory** changes overwhelm the unplanned changes in **inventory** , then production will have a higher variance than sales. A simple model of this behavior implies that the change in **inventory** should nonetheless be negatively correlated with the change in sales. For almost all SIC codes, changes in **inventory** and changes in sales are indeed negatively correlated. This result suggests that **inventories** do act as buffer stock for unexpected changes in sales. The next section proposes the ...firms smooth production over some horizon but also adjust production to maintain a mean desired **inventory** level at a fixed proportion of sales. A stockout avoidance motivation would favor an optimal inventoryto-sales ratio. Although, theoretically, the ratio of **inventory** to sales which minimizes the risk of running out of stock should fall as average...

...we assume that sales are serially correlated and that industries adjust partially to the desired **inventory** -to-sales ratio, then a portion of production will go toward **inventory** investment. We can consider this to be planned **inventory** investment. The length of the production planning horizon will determine how often production will be...

...the next period on last period's sale and the difference between actual and planned **inventory** . The following equations would describe this process: (Formula Omitted)

where X sub t is sales in period t, C is a constant, N sup * sub t t is the desired **inventory** level and N sub t is the actual **inventory** level in period t, P sub t is production in period t, and epsilon sub...

...The coefficient theta can be assumed to be constant and estimated to be the average **inventory** to sales ratio. The term gamma(N sup * sub t-1) in Equation 5 can be thought of as the "planned" component of **inventory** investment, where gamma represents the speed of partial adjustment to desired **inventory** level, and the term DeltaX sub t t can be thought of as the buffer stock movement or "unplanned" **inventory** investment. The "planned" **inventory** investment component will be positively correlated with sales if the firm's target **inventory** is represented by Equation 3, while the unplanned term will be negatively correlated with changes...

...The next section shows the results of testing whether changes in sales and changes in **inventory** are negatively correlated.
CORRELATION COEFFICIENTS For each SIC code and individual firm, I computed the correlation coefficients between the change in sales and the change in **inventory** for each period. To get a measure of the relative co-movement of changes in **inventory** and changes in sales for firms within the SIC code, I computed a simple average...

...comprises most of the aggregate data, the co-movement of that firm's

change in **inventory** and change in sales will not proportionately influence the average correlation coefficient of individual firms...

...codes show a negative correlation of the change in aggregate sales to change in aggregate **inventory** . Likewise, the weighted and unweighted average correlation coefficients of the individual firms are negative for ...

...Of the 13 SIC codes with positive correlations between changes in sales and changes in **inventory** , five SIC codes show negative average (unweighted) correltion coefficients at the firm level. A few...

...simple model of partial adjustment. Correlation coefficients remain positive for wholesale and are negative for **aggregate manufacturing** and retail. This result implies that both firm-level data and aggregated data support the **buffer - stock** hypothesis.

ESTIMATES OF MODEL COEFFICIENTS

The anticipated negative correlation coefficients were verified in the previous...

...estimated by using ordinary least squares. The fraction of sales (theta) that represents the desired **inventory** level N sup * sub t , is estimated as the average **inventory** -to-sales ratio for each SIC code. Table 3 shows the results for each industry...

...95 or 99 percent confidence interval for 25 out of 37 industries for last-period **inventory** levels and for 21 out of the 37 industries for last-period sales. The coefficient...

...and coal products and wholesale durable goods, suggesting that these firms may have been reducing **inventories** during the sample period.

Estimates of gamma for the 25 industries with significant coefficients ranged...
...nondurable goods and averaged 0.4062. This means the speed of adjustment toward the desired **inventory** level ranged from less than one quarter for wholesale nondurables to more than five quarters for primary metals and averaged about two and a half quarters. The **inventory** -to-sales ratio, or theta, averaged 0.6597 for the 21 industries with significant coefficients on both lagged **inventory** and lagged sales. Equivalent to about 1.92 months of sales in stock, this figure...

...the notion that some firms are motivated by stockout avoidance, which leads to a target **inventory** level. As West (1986 and 1990) observes, **inventory** models that include a target level of **inventory** tend to perform ...appear to smooth on a seasonal basis. That is, when sales exhibit strong seasonal patterns, **inventories** are increased during slower quarters and drawn down during peak sales periods. Figure 1 shows sales, **inventory** , and **inventory** -to-sales ratio for one such company The seasonality is obvious in the data. What's more, the negative correlation between **inventory** movements and sales over the seasonal cycle is also obvious. The accentuated seasonal movement in the **inventory** -to-sales ratio confirms the buffer stock role that **inventory** plays, rising during periods of low sales and increasing **inventories** , and falling during periods of high sales and falling **inventories** .
(Table Omitted)

Captioned as: Table 2

(Table Omitted)

Captioned as: Table 3

The company in...

...equipment industry. The seasonality of this industry is probably linked to the seasonality of construction. **Inventory** movement suggests that the firm smooths purchases seasonally, and indeed the computed ratio of the...

...Figure 3 shows one company with mean sales of approximately $5 million per quarter and **inventory** -to-sales ratio of 0.27. The variance ratio of this company is 0.95...

...Figure 4 shows another company with mean sales of $356 million and with a lower **inventory** -to-sales ratio of 0.23. This company has a variance ratio of 0.91...
...the relatively flat sales over the sample period. The seasonal rise and fall of the **inventory** -tosales ratio also gives some indication of the degree of smoothing.

CONCLUSIONS/SUMMARY

The common assumption is that firms use **inventories** to smooth production. Like previous research based on aggregate data, however, my research at the ...

...of the failure to confirm smoothing is that increased demand prompts firms to raise their **inventory** targets levels; thus "planned" **inventory** increases are positively correlated with sales. Unplanned **inventory** changes, which would reflect the buffer stock motivation, are negatively correlated with sales but insufficient...

...In the buffer stock test of the correlation between changes in sales and changes in **inventory** , most firms and 2-digit industrial classifications showed negative correlations. This finding is consistent with the idea that **inventories** act as a buffer stock to unexpected changes in sales. The negative correlation between changes in sales and changes in **inventory** may be a better test of whether buffer stock movement is prompted by random demand...

...result also seems to suggest that many industries may be making partial adjustments in their **inventories** .

(Table Omitted)

Captioned as: Appendix-Table A

Footnote:

1 An alternative **inventory** model called (S,s), suggests that firms with fixed costs of adjusting **inventory** will establish a maximum level of **inventory** (S), and a minimum level (s), and adjust only when **inventory** lolls below the minimum [See Allen (1995) for a brief explanation of production smoothing and...the coefficients However, because y and e are both less than 1.0 and planned **inventory** change will be in the same direction as the change in sales, the change in sales should dominate the planned **inventory** change. In this case, the correlation between the change in sales and change in **inventory** should be negative.

Footnote:
5 Michael C. Lovell mentioned to me in a conversation once that despite the existence of sophist cated **inventory** methods, an informal survey of firms revealed a preference for target levels of **inventory** as a function of sales. This would also help to explain the empirical findings.

Reference:

REFERENCES

Reference:

Alien, Donald S. "Changes in **Inventory** Management and the Business Cycle," this Review (July/August 1995), pp. 17-26. Blinder, Alan S. "Can the Production Smoothing Model of **Inventory** Behavior be Saved?' Quartery Journal of Economics (August 1986), pp. 431-53.

Fair, Ray C...

...Data," Journal of Political Economy (June 1991), pp. 558-81.

Reference:
Lovell, Michael C. "Researching **Inventories** : Why Haven't We Learned More?" International Journal of Production Economics (June 1994), pp. 33-41.

. "Simulating the **Inventory** Cycle," Journal of Economic Behavior and Organization (June 1993), pp. 147-79. Miron, Jeffrey A., and Stephen P. Zeldes. "Seasonality, Cost Shocks, and the Production Smoothing Model of **Inventories** ," Econometrica (July 1988), pp. 877- 908.

West, Kenneth D. "A Variance Bounds Test of the Linear Quadratic **Inventory** Model," Journal of Political Economy (April 1986), pp. 374-401.

. "The Sources of Fluctuations in Aggregate **Inventories** and GNP" QuartedyJournal of Economics (November 1990), pp. 939-71.

Author Affiliation:

Donald S. Allen...

14/3,K/27 (Item 24 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01540901 01-91889
Safety stock management
Krupp, James A G
Production & Inventory Management Journal v38n3 PP: 11-18 Third Quarter 1997
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 3650

...DESCRIPTORS: **Inventory** management

...ABSTRACT: variability in customer demand. Approaches are proposed which can provide some degree of protection against **inventory** imbalances. If properly analyzed, safety stock can be a valuable tool in enhancing the

bottom...
...TEXT: exist many environments in which demand variability for product creates a need for strategic buffer **inventories** in order to optimize service to the customers, in cases where actual demand exceeds the forecast level on which **inventory** replenishment planning is based and backorders are not acceptable. In many manufacturing and distribution environments...

...Therefore, in this article three basic theoretical concepts to enhance the application of strategic buffer **inventories** will be addressed:

1. A statistical model which expresses deviation in units of time, rather ...

...thus creating exposure to inadequate service. In decreasing conditions, the fixed safety stock can generate **inventory** excess, a particularly dangerous condition as a product approaches the end of its life cycle...

...special demands (e.g., promotions, special sales, dating terms, etc.), due to the implications to **inventory** investment. The argument has merit, and the application of this approach in circumstances of accelerating...of its life cycle. The fixed safety stock in this case will remain as "dead" **inventory** at the end of the planning horizon. The TBM-based safety stock, on the other hand, has automatically compensated for this declining trend, and ensures that no excess **inventory** will remain as a consequence of the planning process.

SAFETY STOCK SUPPRESSION IN CASES OF...

...the original assumption of this article: safety stock is intended to provide a strategic buffer **inventory** in the case of customer demands which exceed forecasted demand. Case 1 presents the classic...

...stock is required in this case, as actual demands consistently fail to consume even the **inventory** replenishment planned based on the base forecast. A FETS of +1.0 presents the greatest...was given to the service multiplier k which is used as a factor in the **safety stock** equation. Traditionally, this factor is selected in order to achieve a target service level percentage...

...in mind that these values are based on theoretical statistical applications which may not be **totally** compatible with realworld **demand** dynamics, this approach may be viewed as somewhat heuristic. But the development of a k...

...levels beyond this point yields negative returns.
This initial analysis defines the relationship between gross **inventory** investment and gross sales dollars; but this does not define the bottom-line financial benefit...

...profit realized from the recouped lost sales must be compared to the cost of carrying **inventory** for the related safety stock levels. This more detailed analysis defines the true cost/ benefit...

...Profit Recouped = p(ak - bk2) where p = profit margin, expressed as a decimal while the **inventory** carrying cost is defined by:

Cost of Carrying Safety Stock =r X Safety Stock (in $) Where r = **inventory** carrying cost factor.

The bottom-line effect of the differential is defined by the relationship

...that in this specific example, I have assumed that profit margin percentages are less than **inventory** carrying cost percentages, thus changing the relationship between the two curves from that which was derived from gross dollars. If profit percentage is greater than the **inventory** carrying cost factor, then the intersection would occur at a higher k than the intersection...

...less than break-even) at which the maximum positive differential exists between recouped profit and **inventory** carrying costs. Using ...large swings in demand variance, the recalculated safety stock levels can have dramatic implications to **inventory** and capacity planning: 1. As safety stock quantities change, the master schedule which supports the...

...is specifically decided to "freeze" the MPS). This, in turn, will have impact on downstream **inventory** replenishment planning; internal production scheduling and priorities will be affected, and vendor delivery schedules will...

...in replenishment and capacity planning; the user must determine for himself/ herself whether optimization of **inventory** investment and customer service is worth the potential "nervousness" which statistical approaches represent.

CONCLUSION

Forecast...
...In this article approaches have been proposed which can provide some degree of protection against **inventory** imbalances. It has also been demonstrated that, properly analyzed, safety stock can be a valuable...

14/3,K/28 (Item 25 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01501309 01-52297
Managing demand variations with safety stock
Krupp, James A G
Journal of Business Forecasting Methods & Systems v16n2 PP: 8-13 Summer 1997
ISSN: 0278-6087 JRNL CODE: JBT
WORD COUNT: 2847

DESCRIPTORS: **Inventory** management...

...Buffer **inventories** ;

...ABSTRACT: viewed as wasteful. A paper proposes approaches which can provide some degree of protection against **inventory** imbalances. It also demonstrates that properly analyzed safety stock can be a valuable tool in ...
...TEXT: uses three cases to illustrate the mechanism... describes how to balance the cost of holding **inventory** and profit foregone as a result of outages.

Variations between actual demand and forecast are...

...viewed as wasteful. This article proposes approaches which can provide

some degree of protection against **inventory** imbalances. It also demonstrates that properly analyzed safety stock can be a valuable tool in ...

...preferable, pure application of such methods can at times fail to provide protection against imbalanced **inventories** and/or changes in demand trends. This article will address three basic concepts to enhance the application of strategic buffer **inventories** :

1. A statistical model which provides safety stock calculations which are responsive to trend and...

...total population of random occurrences. In replenishment planning, it is assumed that if the planned **inventory** is equal to the forecast (paralleling the mean point on the bell curve), then k...
...service. On the other hand, in decreasing conditions, the fixed safety stock can generate excess **inventory** , a dangerous condition particularly when a product approaches the end of its life cycle.

TIME...

...of its life cycle. The fixed safety stock in this case will remain as "dead" **inventory** at the end of the planning horizon. The TBM-based safety stock, on the other hand, has automatically compensated for this declining trend, and ensures that no excess **inventory** will remain as a consequence of the planning strategy.

(Table Omitted)

Captioned as: EXHIBIT I

(Table Omitted)

Captioned as: EXHIBIT II

SAFETY STOCK SUPPRESSION
The calculation of statistical- theorybased **safety stock** assumes that distribution is normal. As such, absolute values of each increment of variance are...

...the forecast and actual demand data. (By "bias", we refer to the direction of the **total** variance of actual **demand** data from the forecast. In perfect normal distribution the sum of the actual variances would...

...the original assumption of this article: safety stock is intended to provide a strategic buffer **inventory** where customer demand exceeds forecasted demand. Case 1 is a situation where the average of...

...stock is required in this case, as actual demands consistently fail to consume even the **inventory** replenishment planned based on the base forecast. A FETS of +1.0 presents the greatest...I referred to the service multiplier k which is used as a factor in the **safety stock** equation. Traditionally, this factor is selected in order to achieve a target service level percentage...

...in mind that these values are based on theoretical statistical applications which may not be **totally** compatible with real-world **demand** dynamics, this approach may be viewed as somewhat heuristic. But the development of a k...

...levels beyond this point yield negative returns.

This initial analysis defines the relationship between gross **inventory** investment and gross sales dollars; but this does not define the bottom-line financial benefit...

...profit realized from the recouped lost sales must be compared to the cost of carrying **inventory** for the related safety stock levels; this more detailed analysis defines the true cost/benefit...

...by multiplying the lost sales recouped times the profit margin, while the cost of carrying **inventory** is computed by multiplying the **inventory** investment by the **inventory** carrying cost. The bottomline effect of the differential is defined by the relationship:

(Graph Omitted...

...is attributable to the fact that in normal circumstances, profit margin percentages are less than **inventory** carrying cost percentages, thus changing the relationship between the two curves from which gross dollar amounts were derived; if profit percentage is greater than the **inventory** carrying cost factor, then the intersection would occur at a higher k than the intersection...

...less than break-even) at which the maximum positive differential exists between recouped profit and **inventory** carrying costs. Using mathematical theory, this point can be derived by taking the first derivative...

...Burndy Corporation, Stanley Tools, and Sargent & Co. His articles have appeared in various journals including **Inventories** and Production Magazine, Journal of Business Forecasting, and Production & **Inventory** Management Journal. He is co-winner of the 1978 APICS' Production & **Inventory** Management Journal Award.

Author Affiliation:

For purposes of this article, I will use MAD (Mean...

14/3,K/29 (Item 26 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01445580 00-96567
The role of transportation capabilities in international supply chain management
Morash, Edward A; Clinton, Steven R
Transportation Journal v36n3 PP: 5-17 Spring 1997
ISSN: 0041-1612 JRNL CODE: TRN
WORD COUNT: 6686

...DESCRIPTORS: **Inventory** management
...TEXT: supply chain, such as operational coordination and information sharing, can reduce transportation time and thus **total supply** chain costs. For example, faster transit time minimizes pipeline **inventories** and may allow customers to lower **safety stocks** held in reserve. If time compression results in more frequent deliveries, then cycle stocks also...

...reason, just-in-time (JIT) delivery is important, as discussed in a

subsequent section.

Maximizing **inventory** velocity and reducing dwell-times are other time compression strategies that involve transportation. Velocity refers to how many times **inventory** turns per year, or the average number of days of **inventory** on hand.3 For example, carrier-run flow-through warehouses or cross-docking operations similar...

...truckload (LTL) motor carrier terminals-rather than storage facilities or user distribution centers-should increase **inventory** velocity and therefore lower total **inventory** costs. Actions and policies that increase transportation container velocity will also reduce **inventory** costs.'

Dwell-time ratios are the average number of days **inventory** sits idle in the pipeline compared to the average number of days it is moving...

...ratio of 20:1 is common in industry.5 This means that for every day **inventory** is being transported, it sits idle for twenty days somewhere in the pipeline. Whereas increasing **inventory** velocity involves accelerating warehouse throughput, reducing dwell-time requires bypassing or even eliminating warehouses to...

...and reengineering may allow for transportation and information to serve as substitutes for warehousing and **inventory** costs. In particular, time compression strategies of expedited transportation, increased **inventory** velocity, and minimum dwell-times can reduce pipeline **inventory** , **safety stocks** , and cycle stocks. As a result, **total** **supply** chain costs may be minimized.

Reliability

Structural integration, such as technical operational planning and instrumental...line. This eliminates warehousing and double-handling, substitutes "moving warehouses," and enables Saturn to turn **inventory** more than 200 times per year."

In contrast, unsynchronized transportation can create congestion, confusion, and...

...items, or simply to keep production running. In general, lack of transportation flexibility can raise **inventory** carrying costs, ordering costs, the cost of lost sales, and production costs. In total, all...

...further increase integration of supply chains.12 For example, storedoor-delivery systems or carrier-managed **inventory** reordering, labeling, and displays are innovations developed in response to specific market segments. In turn...with upstream channel suppliers in order, for example, to plan operations and to replenish channel **inventory** . These differences are significant only at the $p < .10$ level, however, so they are not...by efficiency capabilities of faster transportation (e.g., bullet trains, "smart" transportation systems, etc.); increased **inventory** throughput and velocity (e.g., JIT delivery, cross-docking, direct delivery, etc.); standardization of physical...

14/3,K/30 (Item 27 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01429526 00-80513

A multi-sector inventory **model**
Allen, Donald S
Journal of Economic Behavior & Organization v32n1 PP: 55-87 Jan 1997
ISSN: 0167-2681 JRNL CODE: JEB

A multi-sector inventory **model**

...DESCRIPTORS: **Inventory** control

ABSTRACT: Two competing paradigms for firm-level **inventory** behavior are production smoothing and (S,s). Empirical evidence that **aggregate production** varies more than sales, and **inventory** investment is positively correlated with sales, appears to contradict the **buffer - stock** /production-smoothing motivation. Work by Blinder and Maccini (1991) suggests that an (S,s) model...

...heterogeneous agents (representing manufacturing, wholesale and retail agents) who use either smoothing or (S,s) **inventory** decision rules. The results demonstrate that the stylized facts can be explained by a model...

14/3,K/31 (Item 28 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01422789 00-73776
Troubleshooting materials management systems
Krupp, James A G
Production & Inventory Management Journal v38n1 PP: 80-84 First Quarter 1997
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 3538

...ABSTRACT: impact. The issues considered will center on 3 specific phases of materials management: forecast management, **inventory** management, and production planning. ...
...TEXT: impact. The issues considered will center on three specific phases of materials management: forecast management, **inventory** management, and production planning.

FORECAST RECONCILIATION

The foundation of all business planning lies in forecasts...

...SKU forecasts is greater than the overall expected business levels, then the system will drive **inventory** replenishment in excess of the needs of the business, and will unnecessarily consume precious resources...

...expenses

Dying products, where failure to recognize demand decline trends result in excess and obsolete **inventories** , as well as returns exceeding demand.

Any effective materials management system must include the capability... rather than use of heuristic rules, may result in both improved customer service and reduced **inventory** investment.

To continue on this topic, **safety stock** may also contain elements not directly related to customer demand. The most notable of these...

...an alternate supplier. In such cases, demand variation can be supplemented by statistical analysis of **supply** variation, with **total safety stock** comprised of a composite of the two analyses. Under no circumstance, however, should **safety stock** be created to compensate for internal supply failures; yet, this is often factored, rather than...

...has enabled many firms to improve their overall service to the customer while actually reducing **inventory** investment. In such a system, the net available finished goods **inventory** by SKU is constantly monitored against a daily average sales in units. When the days...

...on a proactive basis, with direct improvement in both customer satisfaction and service-level performance.

INVENTORY POLICY DOCUMENTATION/ MODELING

Effective **inventory** management begins with a cultural recognition that **inventory** is part of a strategic approach to running the business, not a consequence of day-to-day operations. Contrary to popular myth, **inventory** is not "evil" if it is maintained at optimum levels derived from the operating needs...

...including the highest levels must be party to the identification and development of the strategic **inventory** policies and planning parameters which will support the needs of the business, while remaining within...

...refinement of policies and execution are necessary to generate "continuous improvement" in the levels of **inventory** required. The fundamental indicator of whether this activity is occurring lies in the development of a detailed **inventory** model, identifying attainable days of supply and consequent **inventory** turns based on policies in place. As part of the overall business planning activity, the optimum model would identify **inventory** requirements for the various components of **inventory** (raw material, work-in-process, finished goods, etc.) separately. Too often, **inventory** management policies are not formalized or documented, and thus are not communicated throughout the organization; further, no evaluation has been performed of the achievable days of supply/ **inventory** turns which would result from such policies. A fundamental element in effective **inventory** management lies in a detailed definition of **inventory** policies required to support strategic business objectives, and an **inventory** model which identifies the resulting days of supply/turns.

INVENTORY PROFILING

With a target **inventory** defined, the next issue must be the identification of the profile of the current **inventory** , in terms of its utility, in order to derive an action plan to attain optimum turns levels. To facilitate this, an **inventory** profiling technique to segregate **inventory** at the part number level into its major components should be used, identifying operating **inventories** versus surplus, EIO (excess, inactive, and obsolete), and new product **inventories** . This is also known as a "micro-management" approach, and was recently addressed in an article in this journal [2]. The key to **inventory** reduction lies in reducing **inventory** in the surplus and EIO categories to an absolute minimum, as well as ensuring that initial **inventory** buildups for new products are consistent with real expectations rather than overenthusiastic forecasting. Attacking these specific areas enables **inventory** reduction without cutting into the operating **inventory** which is required to maintain effective operational and customer support. Further, long-term **inventory** management mandates that preventive action be taken to keep the surplus and

EIO categories under effective control. A key **inventory** management tool lies in **inventory** reporting which clearly identifies the profile and utility of **inventory** , and defined programs to reduce "surplus" and EIO **inventories** and to prevent recurrence.
INPUT/OUTPUT CONTROLS

With an **inventory** model in place, and a profile of existing **inventories** visible to management, the progression toward achieving optimum turns becomes readily visible. Factoring the plan which can be derived by such issues as level loading and seasonal **inventory** builds, target **inventories** by month become realistic objectives; this in turn yields visibility to net change in **inventory** position by month. This net change, in turn, drives the single most important measuring system...

...and tracking system. Simply put, one determines the input of material, labor, and overhead to **inventory** versus the projected cost of sales relief to achieve the net change in **inventory** necessary to achieve the target **inventory** level for each month. The actual input and output are then measured no less often...used to adjust the following month's budget. This, again, is a function of managing **inventory** , rather than attempting to control it after the fact. An input/output budget based on the **inventory** plan, along with defined programs to identify deviations and initiate corrective action, becomes a critical element in ensuring that **inventory** objectives will be achieved.

RESPONSE TO CHANGE
A further issue lies in responsiveness to change in **inventory** planning systems. The dynamics of most marketplaces are such that plans will constantly need to be updated to respond to changing customer needs and/or current market conditions. Yet, **inventory** replenishment planning is such that lead times require the establishment of orders in advance. We...

...mandatory activity to sustain customer service, deexpediting is often minimized or overlooked. A truly effective **inventory** management system must respond to changes in demand by rescheduling out or canceling, as well as rescheduling in. Often, de-expediting is neglected due to perceived limitation of resources; but **inventory** optimization, as well as credibility with suppliers, mandates that replenishment demands be maintained in constant...

...RECONCILIATION

In many environments, different drivers exist in providing input and output to the perpetual **inventory** system and the book (general ledger) value of **inventory** . Where such a dichotomy exists, the potential exists for the two values to become out of balance, particularly where transactions which effect one **inventory** value are not properly communicated to the other set. For instance, perpetual transactions which represent variances unrecognized by the financial system may result in overstatement of **inventory** (and profit) on an ongoing basis; such a differential may well result in a surprise **inventory** "shrink" in physical **inventory** . Conversely, the "macro" level transactions which occur in the financial system, combined with failure to properly transact **inventory** movement in the perpetual system, may result in correct book **inventories** but inflated perpetual **inventories** ; this is not conducive to sustaining the minimum 95% **inventory** accuracy objective which is considered a prerequisite for successful MRP II systems. The only effective method for ensuring that the two **inventories** remain in balance lies in a monthly (or more frequent) comparison of the dollarized perpetual **inventory** at standard cost to the book **inventory** maintained by the accounting function. If discrepancies

are determined, it is essential to determine the...

...ongoing valuations remain in balance, in order to avoid surprises either at the time physical **inventory** is taken, or when one goes to pull parts which the perpetual system indicates are...

...only to find that the parts are, in fact, not available. In cases where book **inventory** and perpetual **inventory** are valued independently, it must be mandatory that a book-toperpetual reconciliation occur on a...
...intervention in the planning process to ensure that capacity constraints, load leveling, and/or seasonal **inventory** builds have been considered. As a result, production schedules are often unrealistic, conflicting priorities exist...

...take into consideration all of the key business considerations which drive production activity: sales forecasts, **inventory** objectives, capacity constraints, load leveling, seasonality, profit objectives, plant utilization, etc. It is not sufficient...

...rough-cut production plans (minimum 12month rolling) which consider all critical business issues (capacity, seasonal **inventory** builds, load leveling, etc.) must be in place to ensure that management objectives are clearly the material needs to meet established management objectives or excessive **inventory** in the supply chain. Any variation between the total of the master schedule and the...

...Use of statistical deviation as a basis for safety stock calculations (rather than heuristic rules). **Inventory** Management:

4. Detailed definition of **inventory** policies required to support the strategic business objectives, as well as a detailed **inventory** model which quantifies **inventory** policies in place, and the resulting weeks of supply/ turns.

5. **Inventory** reporting which clearly identifies the profile and utility of **inventory** , and defined programs to reduce "surplus" and EIO **inventories** and to prevent recurrence.

6. Input/output budgets and monitoring system, along with defined programs ...

...in and out, as well as cancel, open replenishment orders.

8. In cases where book **inventory** and perpetual **inventory** are valued independently, a book-to-perpetual reconciliation on a periodic basis (no less often...

...Extended rough-cut production plans which consider all salient business issues (e.g., capacity, seasonal **inventory** builds, load leveling, utilization).

10. Reconciliation between master schedules in units and total production levels...
...by management.

Reference:

REFERENCES

1. Krupp, J. A. G. "Effective Safety Stock Planning." Production and

Inventory Management 23, no. 3 (1982).

2. ."Measuring **Inventory** Management Performance." Production and **Inventory** Management Journal 35, no. 4 (1994).

Author Affiliation:

About the Author

JAMES A. G. KRUPP...

14/3,K/32 (Item 29 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01370357 00-21344
The impact of inventory **centralization/decentralization on safety stock for two-echelon systems**
Caron, Franco; Marchet, Gino
Journal of Business Logistics v17n1 PP: 233-257 1996
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 1452

The impact of inventory **centralization/decentralization on safety stock for two-echelon systems**

...DESCRIPTORS: **Inventory** management

...ABSTRACT: an independent system based on a limited amount of information about demand, aims at maximizing **inventory** cost savings, given a specified level of customer service in terms of **inventory** availability.
...

...TEXT: safety stock.

In the case of order-point systems, which are widely used in industrial **inventory**

management, procurement lead times are equal to the order-delivery cycle time between the central...

...Chart Omitted)

Captioned as: FIGURE 1

An independent system is characterized by a location-based **demand aggregation** leading to savings in **safety stock**, since the central warehouse is subject to the overall demand variations of all geographic areas. Conversely, a coupled system (where **safety stock** is located at remote warehouses only) is characterized by a time-based **demand aggregation**, since its stock is capable of meeting local demand variations during the whole time span...

...concept of portfolio effect in the case of two warehouses and analyzed the effects of **inventory** centralization/ decentralization on aggregate safety stock. Tallon3 extended the portfolio effect model to the case...

...Bowersox,4 the "probability of stockout within lead time" is used as a measure of **inventory** availability level. A second index based on the item fill rate5 is often used in industrial practice:

In developing the model, we evaluate the **inventory** availability level through the "probability of stockout" (i.e., **inventory** availability level = 1 -"probability of stockout"). In this way it is possible to compare different...

...the overall safety stock required independently of the order quantity and the target level of **inventory** availability (see equation 11).

Since safety stock represents a main component of overall distribution costs, the choice between an independent and a coupled system aims at maximizing **inventory** cost savings, given a specified level of **inventory** availability.

The different types of lead time employed for the evaluation of **inventory** availability level vary according to the type of system and warehouse:
A. independent system

central...Footnote:

ID. B. Rosenfield and M. E. Pendrock, "The Effects of Warehouse Configuration Design on **Inventory** Levels and Holding Cost," Sloan Management Review 21 (Summer 1980): 21-33.

2W. Zinn, M. Levy, and D. Bowersox, "Measuring the Effect of **Inventory** Centralization/Decentralization on Aggregate Safety Stock: The "Square Root Law Revisited," Journal of Business Logistics 10, no. 1 (1989): 1-13. 3W. J. Tallon, "The Impact of **Inventory** Centralization on Aggregate Safety Stock: The Variable Supply Lead Time Case," Journal of Business Logistics ...

...Note 2 and W. Zinn, M. Levy, and D. Bowersox, "On Assumed Assumption and the **Inventory** Centralization/Decentralization Issue," Journal of Business Logistics 11, no. 2 (1990): 142. 5R. H. Ballou...

14/3,K/33 (Item 30 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01363057 00-14044
Integration for the future
Fox, Mary Lou
Manufacturing Systems v14n10 PP: 98-104 Oct 1996
ISSN: 0748-948X JRNL CODE: MFS
WORD COUNT: 2000

...TEXT: the typical supply chain, freeing up to $30 billion in current carrying costs and reducing **inventories** by 41 percent.

Other industries also have lengthy product flows and excessive supply chain costs...

...inbound materials; manufacturing for production scheduling and plantto-plant transfers of intermediate products; distribution for **inventory** levels and the replenishment of finished goods; and the customer's buyers for ordering. Therefore...

...that trading partners do not co-operatively share projections about future needs. Therefore, buffers of **inventory** and time are created to

allow each supply-chain function to perform reasonably efficiently without ...

...or unconstrained plans are created that may not be feasible.

Tactical plans for upcoming weeksforecasts, **inventory** , transportation, production and material plans-are done separate from daily activities, which adds to the...

...recognizing that supply-chain management offers the best hope to coordinate product flows. But, if **inventory** and time simply are ripped out of the supply chain, massive disruptions will occur and...

...will be affected. Rather, information about current and projected product flow must be substituted for **inventory** and time. Effective planning processes are established to ensure that purchasing, manufacturing, distribution, transportation, marketing...

...stock for that same stock keeping unit (SKU) is a plan for that component of **inventory** each week into the future. A replenishment plan for the same SKU shows the quantity judgments affecting future demand.

A well-designed supply chain ensures that **inventory** will be bought, produced or moved as needed to meet the demand. Demand for a...

...which it is a component.

Supply planning for the item at the plant must consider **total demand** and the need for **safety stock** . Then, one must determine the best, most costeffective method of resupplying the item. All these...

...the ability to manage the tactical needs of the supply chain for managing finished goods **inventory** and determining manufacturing requirements as well as the daily need to determine what **inventory** should be deployed to the distribution center (DC). In addition, DRP must be able to...

...not supply-chain planning because it merely produces an unconstrained wish list of finished goods **inventory** requirements. Supply-chain processes must be realistic, achievable, feature different algorithmic needs for different time...

...Tactical supply planning for the future requires numerous trade-offs, such as when to start **inventory** builds; when to increase/decrease safety stocks; how many loads to commit to carriers; when...
...system should determine time-phased SKU safety stocks, realistic shipping schedules, special pack component plans, **inventory** builds, material plans and. constrained production plans at all manufacturing sites. It is important that...

...visible to all planners.

To truly represent reality, the daily activities to produce stock, deploy **inventory** , build loads and select modes/ carriers must be represented with great granularity of planning detail...

...that meet service requirements.

Supply planning must use the same time-phased information about demand, **inventory** , production and network structure for planning for several days

or for upcoming weeks. To achieve...the past. The right product level will meet demand with significant reductions in cycle time, **inventory** , transportation and manufacturing costs, and improvements in customer service.

Author Affiliation:
Mary Lou Fox, CPIM...

14/3,K/34 (Item 31 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01295360 99-44756
A production ordering system for two-item, two-stage, capacity-constraint **production and** inventory **model**
Ishii, Kazuyoshi; Imori, Shigeki
International Journal of Production Economics v44n1,2 PP: 119-128 Jun 15, 1996
ISSN: 0925-5273 JRNL CODE: EPE

A production ordering system for two-item, two-stage, capacity-constraint production and inventory **model**

...DESCRIPTORS: **Inventory** control

ABSTRACT: An effective production ordering system for two-item, two-stage, capacity-constraint production and **inventory** systems is proposed, which reduces the fluctuations in total work load and **inventory** levels. The model system developed manufactures two final products whose component parts are a standard...

...optional specifications chosen by the customer. As a result, simulation shows the influences of the **safety stock** of the optional component parts, average total work load ratio, and coefficient of variation of **demand** upon standard deviations of **total** work load and **inventory** levels in each stage. ...

14/3,K/35 (Item 32 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01295359 99-44755
Comparative analysis of ordering models for an international co-operative global complementary production system
Hiraki, Shusaku
International Journal of Production Economics v44n1,2 PP: 105-117 Jun 15, 1996
ISSN: 0925-5273 JRNL CODE: EPE

...DESCRIPTORS: **Inventory** control

...ABSTRACT: merit, each production base produces only special kinds of components and machining parts for the **total demand** required in all the participating countries, and supplies them to the other production bases. A production, **inventory** and transportation system is designed to realize high productivity and low **inventory** in the ICGCPS for the mutual development of all the countries. Two types of ordering...

...of these two ordering models with respect to the distribution properties of ordering, withdrawal and **inventory** quantities at each stage and stock point for determining adequate **buffer** **stock** in the system. ...

14/3,K/36 (Item 33 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01217104 98-66499
Foodservice logistics: Ripe for change
Troyer, Charles R
Transportation & Distribution v37n5 PP: 106 May 1996
ISSN: 0895-8548 JRNL CODE: HLS
WORD COUNT: 718

...TEXT: to commissaries, foodservice distributors, or manufacturers further upstream.

The benefits: 1) in these central locations, **inventory** is more effective because it can service multiple end use points; 2) the cost of...

...full-time" employee in a production facility upstream.

Market-Level Forecasting. This refers to the **aggregation** of **demand** information to a market and/or category level of detail. Tying customer/item **demand** to this higher **aggregate** , in turn, enables a company to squeeze out much of the uncertainty in the resulting overall forecast. Thus, **safety** **stock** levels at the item level can be reduced. Alternative Flows for Fast-Movers. For a...

...single or multi-stops) to large operator locationscompletely bypassing the distributor DC--which eliminates labor, **inventory** , and a transportation leg. In this scenario, fixed cost are cut, and variable mileage-based...

...might think, creating master distributors in a region, or using re-distribution, actually can reduce **total** **supply** chain costs. Even though a transportation leg and some handling steps are added, transportation utilization and **inventory** effectiveness gains more than offset the incremental and fixed costs associated with these activities. By collapsing multiple **inventories** of a slow-moving item into a single pool, a company can increase the channel velocity and lessen the **safety** **stock** requirements. In addition, the consolidation of many LTL shipments of a small number of slow...

14/3,K/37 (Item 34 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01170101 98-19496
A structured method for applying purchasing cost management tools
Ellram, Lisa M
International Journal of Purchasing & Materials Management v32n1 PP: 11-19 Winter 1996
ISSN: 0094-8594 JRNL CODE: JPR
WORD COUNT: 6359

...TEXT: mutual commitment. This approach creates strategic opportunities

for improvement.(30)

Total Cost Modeling of the **Supply** Chain

Total cost modeling of the supply chain uses the approach suggested above, but goes beyond these...

...s suppliers can increase supply chain cost substantially by creating expediting, premium shipments, and excess **safety stock** . The buyer and the supplier could then work with the "problem" supplier, informing it about...
...costs go up for the retailer if it must have a place to store stockpiled **inventory** , and tie up capital in excess **inventory** . Thus, some manufacturers have found that the best solution is to offer an "everyday low...

14/3,K/38 (Item 35 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01145092 97-94486
Themes for facilitating material flow in manufacturing systems
Harrison, Alan
International Journal of Physical Distribution & Logistics Management
v25n10 PP: 3-25 1995
JRNL CODE: IPD
WORD COUNT: 7166

...TEXT: improves I return on investment. Oliver[8] points to the trade-off between idle materials (**inventory**) and idle machines. This would be a particular problem for capital intensive plants making use...

...Lambrecht[10]. How can we guarantee flexibility and a fast response without the protection of **inventory** , as JIT asks us to do? JIT, he argues, is fairly good for stable production...

...used to create "capacity slack", which can be used to reduce both lead time and **inventory** [11]. Capacity slack is then a strategic alternative to lead time. South[12] argues that...

...queue size in a random environment.
Other authors take up further aspects of the capacity- **inventory** trade-off. South and Hixson[13] analyse simple examples of finished goods **safety stock** related to probability distribution for **total demand** . They conclude that opportunities to reduce finished goods stock should be sought whenever there is...

...approach, Mapes[14] finds that, as capacity utilization approaches 100 per cent, substantial increases in **safety stock** are necessary in order to maintain customer service levels. Looking at work in process (WIP) rather than at finished goods **inventory** , Crandall and Burwell[15] modelled a flow shop with a fixed sequence of operations, and...better decisions) giving way to a JIT focus (eliminate the causes which made you need **inventory** in the first place). As Karmarkar[19] noted, the debate needs clarity, and then it...

...be superior in terms of mean daily job completion, queue times, job lead times and **inventory** . While an attractive alternative to push, JIT was found to be more finely tuned and...

...requirements;

(2) manufacturing complexities (like inaccurate databases and poor information flow).

He proposes a temporary **inventory** "wall" of finished goods between manufacturing and the customer base. If there are many finished...

...statistics or demand and manufacturing lead times to determine the approximate size of the downstream **inventories** necessary to stabilize the manufacturing schedules[17]. The wall is reduced by lead time improvements ...

...Figure 4 omitted) The rewards of reducing uncertainty and increasing flexibility are that buffers (capacity, **inventory** and throughput time) can be cut.

Proving such claims has been more difficult, and has...

...improved on-time performance. Yet Zangwill[33] shows that reduced setup costs can actually cause **inventory** and costs to increase. The opposite results to JIT theory may result. The existence of...to identify the value associated with a reduction of variability and trade-off between increased **inventory** and lost production". Lee and Seah[36] modelled eight process stations where each job is...and 128 international manufacturing companies provide evidence that reducing TT leads to better quality, lower **inventories** , a rationalized process, reduced chaos, lower overheads and improved response times.

A striking example of...

...is added in the manufacturing and transportation stages. The vertical axis shows the average standing **inventory** in days. New defines throughput efficiency as the ratio of work content to elapsed time...

...400 per week. While it may have been possible to meet such fluctuations with high **inventories** and long lead times, once it tries to reduce these, factory output must be able...situation where sales forecasts are always notoriously poor, the problem of managing availability and low **inventories** comes down to flexibility, simplicity and speed of manufacture. It is thus a design issue...

...being able to complete and deliver the product in a five-day target. A new **inventory** profile is envisaged, shown in Figure 10. (Figure 10 omitted)

Giust[56] further develops this...
...effect of time delays and decision rates between a factory, its warehouse, a distributor's **inventory** and retail **inventory** . (Figure 11 omitted) It is a closed loop system where product flows clockwise and customer...

...POQ, a point which they demonstrate by simulation under a number of conditions. "Safety stock **inventory** costs, and the related expected stockout costs, can only be reduced if some means to...act of faith" which may increase market share. But flexibility and fast response may need **inventory** in some circumstances. JIT systems may simply not be sufficiently robust where there is high...

...Paul Chapman, London, 1994.

2. Heiko, L., "A simple framework for understanding JIT", Production and **Inventory** Management Journal, 4th Quarter, 1989, pp. 61-3.

3. Davy, J.A., White, R.E...Production Management, Vol. 13 No. 5, 1993, pp 41-53.

10. Lambrecht, M., "The capacity- **inventory** tradeoff in JIT", paper presented to EI-ASM Conference, London Business School, April 1993.
11...

...C. and Papke-Shields, K.E., "Capacity slack: strategic alternative to lead time", Production and **Inventory** Management Journal, 4th Quarter, 1993, pp. 1.5.

12. South, J.B., "Continuous excess capacity versus intermittent extra capacity to control average queue size in a random environment", Production and **Inventory** Management Journal, 1st Quarter, 1985, pp. 103-10.

13. South, J.B. and Hixon, R., "Excess capacity v. finished goods safety stock", Production and **Inventory** Management Journal, 3rd Quarter, pp. 3640.

14. Mapes, J., "The effect of capacity limitations on...

...33.

15. Crandall, R.E. and Burwell, T.H., "The effect of work-in-process **inventory** levels on throughput and lead times", Production and **Inventory** Management Journal, 1st Quarter, 1993, pp. 6-11.
16. Bassett, G., "Job shop operations reform...

...5-18.

23. Chapman, S.N., "Schedule stability and the implementation of JIT", Production and **Inventory** Management Journal, 3rd Quarter, 1990, pp. 66-70.

24. Toomey, J.W., "Establishing **inventory** control options for JIT applications", Production and **Inventory** Management Journal, 4th Quarter, 1989, pp. 13-15.

25. Voss, C.A. and Harrison, A...

...214.

26. Bolander, S.F. and Taylor, S.G., "Process flow scheduling principles", Production and **Inventory** Management Journal, 1st Quarter, 1991, pp. 68-71.

27. Taylor, S.G. and Bolander, S.F., "Process flow scheduling calculations", Production and **Inventory** Management Journal, 1st Quarter, 1993, pp. 58-63.

28. Taylor, S.G. and Bolander, S.F., "System framework for process flow industries", Production and **Inventory** Management Journal, 4th Quarter, 1993, pp. 12-7.

29. Wheatley, M., "Go with the flow", Management Today, February 1989, pp.

99-103.

30. Hall, R.W., Zero **Inventories** , Dow Jones Irwin, Homewood, IL, 1983.

31. Newman, W.R., Hanna, M. and Maffei, M...

...Cox, J.F., "Addressing manufacturing problems through the implementation of just-in-time", Production and **Inventory** Management Journal, 1st Quarter, 1991, pp. 33-6.

33. Zangwill, W.J., "The limits of...

...NY, 1984.

39. Schragenheim, E. and Ronen, B., "Drum-buffer-rope shopfloor control", Production and **Inventory** Management Journal, Vol. 31, No. 3, 1990, pp. 18-23.

40. Goldratt, E.M., "Computerised...

14/3,K/39 (Item 36 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01129510 97-78904
Just-in-time purchasing and supply: A review of the literature
Waters-Fuller, Niall
International Journal of Operations & Production Management v15n9 PP: 220-236 1995
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 7770

...TEXT: materials and services account for between 50 per cent and 80 per cent of the **total** cost of a **manufactured** product, and it is further estimated that suppliers account for 30 per cent of the...

...application of JIT depends to a great extent on suppliers, since with little or no **safety stock** in the system, the timing, quality and quantity of deliveries are vital. Also, Ansari and...33]. Ramsey[34] and Quayle[35] both conclude that the combination of single sourcing and **inventory** reduction throughout the supply chain is highly risky for the UK because firms become more...the logistics of the buyer-supplier interface and the need for, and size of, buffer **inventories** .

The customer is able to reduce buffer stocks when there is sufficient confidence in the supply relationship with vendors[29], although Hay[49] points to the use of "strategic **inventory** " until both supplier and customer approach perfection regarding defects, variation, lead time and flexibility. Das...

...and may be located on the buyer's site[52]. Fieten[51] recommends that the **inventory** is jointly financed although it is normally maintained at the supplier's cost.

However, deliveries...

...between the expected costs of small lot delivery (increased transportation costs) and the savings (reduced **inventory** carrying costs), which is reflected in Ramashesh's[54] lot sizing model.

Higginson and Bookbinder...Data Interchange (EDI) as a key to successful JIT in that it aids in pushing **inventory** back up the supply chain. Carter and Frendenhall[57] define EDI as direct electronic transmission...

...disturbance is amplified further up the supply chain. There is therefore a need to reduce **demand** amplification for the **total** chain and to this end, Wikner et al.[63] propose five methods of damping the...
...authors conclude that with effective design only one level of the supply chain need provide **buffer stock** which will fluctuate with the market. On the basis of this model therefore, it would...

...that an economy running on a JIT basis may be more stable than a conventional **inventory** economy.

JIT purchasing benefits

JIT purchasing is an important part of the overall JIT programme and can produce benefits of reduced lead times, reduced **inventories** , improved quality, improved lead time reliability, reduced material costs and improved flexibility[19]. According to...

...include reductions in finished goods and WIP carrying costs and increased control of finished goods **inventory** through steady and predictable shipments[29]. Studies[22,26,41,45,67] have shown that...

...the following benefits for the buyer:

* reduced raw material stocks by 50 per cent;
* increased **inventory** turnover by 97 per cent;

* reduced scrap by 40 percent;

* increased supplier quality 26 per...to the supplier[39]. Specifically, the supplier becomes responsible for quality, delivery, packaging, design and **inventory** . It is the final area which seems to cause most distress to suppliers, but, in...

...up, holding and distribution costs[70]. Not only are there increased quality, design, transportation and **inventory** costs for the supplier, but there is also an increase in the transaction costs, especially...

...less than a third of suppliers thought JIT does anything other than "transfer responsibility for **inventory** from customers to the suppliers"; and customers rarely provided level schedules. The survey also showed...

...manufacturing in lot sizes greater than the JIT delivery batch and were stockpiling thereby increasing **inventory** levels. Helper also states that US auto makers have reacted in one of two ways...

...stores them until use. By implementing small lot production both buyer and supplier can reduce **inventory** costs. However, a popular view held by OEMs, and promoted by Schonberger is "The most...

...of JIT buying is, as one Kawasaki buyer put it 'working off someone else's **inventory** '"[29]. Not surprisingly therefore, there are many reports of JIT suppliers being forced to hold **inventory** for their customers[21,27,37,50,60, 61,64,68,70,75,76]. A...

...the supply chain -- anywhere so long as it doesn't cost the assemblers

money". This **inventory** shift occurs if there are fluctuating schedules or if the lot size required is less...

...supplier will have increased costs either in the form of increased production costs or increased **inventories** .

However, Hall[7] argues that this is a misconception; **inventories** may temporarily be shifted to suppliers but the long-term goal is **inventory** reduction throughout the supply chain. Schonberger and Gilbert[29] state that the supplying plant does...

...a marginally significant difference in answer to a survey question on the subject of suppliers' **inventory** levels. Twenty-two per cent of OEMs considered that suppliers held a higher level of...the data can be considered secondary and the OEMs have an interest in suggesting that **inventory** levels will diminish.

In order to gain the full benefits of JIT supply, the supplier...

...of potential research in taking a system-wide perspective of the JIT exchange. In theory, **inventory** is removed from the supply chain, although some suppliers suggest that their **inventory** levels have increased. Future research could investigate whether **inventory** has indeed been removed from the chain, or simply re-distributed to other, upstream members of the chain. These suppliers will be able to hold **inventory** more cheaply than the manufacturer, hence the system-wide **inventory** cost may be reduced. However, some authors suggest that the further upstream in the supply...

...fluctuations will be following market changes. Suppliers may therefore be holding a greater quantity of **inventory** , leading to an overall increase in the **inventory** cost within the supply chain. The result of this is that either the members of...

...response time to changes in demand would be expected to increase the further upstream the **inventory** is held.
There are further avenues of research which could concentrate on supplier benefits of...

...sourcing is more rather than less efficient. There are operational criteria cited indicating improvements in **inventory** turns, supplier responsiveness and quality, while others point to the strategic implications of JIT sourcing...

...shifting of responsibilities (and costs) from the buyer to the supplier, especially in terms of **inventories** . **Inventory** is ...Schonberger, R., Japanese Manufacturing Techniques, Free Press, New York, NY, 1982.

7. Hall, R., Zero **Inventories** , Dow-Jones Irvine, Homewood, IL, 1983.

8. Newman, R.G. and Rhee, K.A., "A...

...20.

9. Payne, T.E., "Acme manufacturing: a case study in JIT implementation", Production and **Inventory** Management Journal, second quarter, 1993, pp. 15-20.
10. Sohal A.S., Keller, A.Z...

...Burton, T.T., "JIT/repetitive sourcing strategies: tying the knot with your suppiers", Production and **Inventory** Management Journal, Vol. 29 No.

4, 1988, pp. 38-41.

18. Naumann, E. and Reck...

...41-50.

20. Inman, R.A., "Quality certification of suppliers by JIT manufacturers", Production and **Inventory** Management Journal, Vol. 31 No. 2, 1990, pp. 58-61.

21. Manoochehri, G.H., "Suppliers...

...Ansari, A. and Modarress, B., "Potential benefits of JIT purchasing for US manufacturers", Production and **Inventory** Management Journal, Vol. 28 No. 2, 1987, pp. 30-35.

23. De Treville, S., Disruption...
...R, A survey of just in time purchasing practices in the United States", Production and **Inventory** Management Journal Vol. 32 No. 2, 1991, pp. 43-9.

28. McDaniel, S., Ormsby, J...

...54-68.

30. Leavy, B., "Two strategic perspectives on the buyer-supplier relationship", Production and **Inventory** Management Journal, Vol. 35 No. 2, 1994, pp. 47-51.

31. Sako, M., Prices, Quality...A. and Jambekar, A.B., A dynamic view of vendor relations under JIT", Production and **Inventory** Management Journal, Vol. 31 No. 4 1990, pp. 65-70.

48. Celley, A.F and...

...22 No. 4, 1986, pp. 9-15.

49. Hay, E.J., "Implementing JIT purchasing", Production & **Inventory** Management Reviews Vol. 10 No.4, 1990, pp. 38-40.
50. Das, C. and Goyal...

...Vol. 21 No. 2 1991, pp. 3-9.

54. Ramasesh, R.V., "Recasting the traditional **inventory** model to implement JIT purchasing", Production and **Inventory** Management Journal, Vol. 31 No. 1, 1990, pp. 71-5.

55. Higginson, J.K. and...

...R. and Fredenhall, L.D., "The dollars and sense of electronic data interchange", Production and **Inventory** Management Journal, Vol. 31 No. 2, 1990, pp. 22-5.

58. Millen, R.A., "Utilization...

...of just in time purchasing in Dynapert's transition to world class manufacturing", Production and **Inventory** Management Journal, Vol. 4 No. 2, 1993, pp. 71-6.

66. Lyons, T., Krachenberg, A...

...11-15.

68. Romero, B.P., "The other side of JIT suply management", Production and **Inventory** Management Journal, Vol. 32 No. 4, 1991, pp. 1-2.

69. Inman, R.A. and...

14/3,K/40 (Item 37 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01070316 97-19710
The extent of just-in-time manufacturing in the UK: Evidence from aggregate economic data
Procter, Stephen J
Integrated Manufacturing Systems v6n4 PP: 16-25 1995
ISSN: 0957-6061 JRNL CODE: ING
WORD COUNT: 5281

...TEXT: narrowest conception of the term, JIT can be regarded as a system of stock or **inventory** control. The necessary consequence of producing, assembling and receiving goods just-in-time is that...

...of the most successful parts of Japanese manufacturing industry. It can be considered alongside cellular **manufacture** , **total** quality management (TQM) and the development of co-operative rather than adversarial buyer-supplier relations...

...flows required by JIT[3,4]. Similarly, TQM is necessary once the comfort of the **buffer** provided by **stocks** is removed[5], while adversarial supplier relations would render redundant any internal progress towards JIT ...by Dubois and Lenerius[12] in their study of the impact of computerized production and **inventory** control systems. Looking at manufacturing industry in Sweden, the USA, West Germany and Japan over...

...1966-1980, they concluded that "It is very difficult to find any systematic improvement in **inventory** ratio in any country"[12, p. 5]. There was thus a "sharp contrast" in each...Hidden Lessons in Simplicity, Free Press, New York, NY, 1982.

2. Waters, C.D.J., **Inventory** Control and Management, John Wiley, Chichester, 1992.

3. Hassard, J.S. and Procter, J.S...

...Oxford, 1992.

12. Dubois, P. and Lenerius, B., "Materials management efficiency: an international survey of **inventory** ratio development", Proceedings of 7th International Conference on Production Research, University of Windsor, Ontario, Canada...

...London, 1993.
14. Census of Production, Summary Volume, HMSO, London, various years

15. Abramovitz, M., **Inventories** and Business Cycles, National Bureau of ...Klein, L.R. and Popkin, J., "An economic analysis of the post war relationship between **inventory** fluctuations and change in aggregate economic activity", in **Inventory** Fluctuation and Economic Stabilization,

The Joint Economic Committee, Washington DC, 1961.

17. Lundberg, E., Studies...

...Expansion, P.S. King & Sons, London, 1937.

18. Metzler, L., "The nature and stability of **inventory** cycles", Review of Economic Statistics, Vol. 23, August, pp. 113-29.

19. Monden, Y., Toyota...

14/3,K/41 (Item 38 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01018348 96-67741
Expanding the square root law: An analysis of both safety and cycle stocks
Evers, Philip T
Logistics & Transportation Review v31n1 PP: 1-20 Mar 1995
ISSN: 0047-4991 JRNL CODE: LTR
WORD COUNT: 4471

...DESCRIPTORS: **Inventory** management...

...Buffer **inventories** ;

...ABSTRACT: The suggested alternatives more accurately predict, when certain assumptions are met, the reduction in total **inventory** caused by a single consolidation of stock-keeping locations. It is found that, while cycle...

...locations or the more the number of decentralized locations, the greater the percent reduction in **inventory** . However, the models also suggest that different types of **inventory** are affected differently by consolidation. When the limiting assumptions are made, safety stocks produce greater savings in **inventory** reduction stemming from consolidation than cycle stocks do. ...

...TEXT: impact of consolidation upon cycle stocks. This paper integrates cycle stocks into the analysis of **inventory** consolidation and reexamines the traditional square root formulation in light of the augmentation. The remainder...

...and associated literature are discussed. Then, the consolidation effect, which accounts for the impact that **inventory** consolidation has on both safety and cycle stocks, is considered. Finally, enhanced square root laws ...

...of stock-keeping locations has long been recognized as directly affecting the total amount of **inventory** held at these locations. Smykay (1973) noted that the safety stock held at a single...

...1976) derived a square root law which maintains that, in general, the ratio of centralized **inventory** to decentralized **inventory** is equal to:

Sq. root of m/Sq. root of n (1)

where: m = number...

...assorted industries demonstrating that the square foot law is often

overly optimistic with regard to **inventory** savings. Several practical reasons were claimed to cause actual **inventory** savings to be less than expected:

"1. A number of the items [in **inventory**]...may be joint ordered causing increased **inventory** levels so as to realize the benefits of volume buying or shipping.

2. Forward buying...

...which the theory is based such as equal item service levels and costs.

7. An **inventory** policy may be followed that relates **inventory** levels directly to demand.

8. There may be poor **inventory** management" (Ballou 1981, pp. 148-150).

Zinn, Levy, and Bowersox (1989) showed that the Smykay...

...a special case of their portfolio effect model.(2) They considered only the case where **inventory** locations are reduced to one. Further, they assumed cycle stocks are set equal to the...
...Tallon (1993) addressed the issue of variable lead times. Work also was performed that examined **inventory** consolidations but did not specifically feature the portfolio effect model, including Eppen (1979), Mehrez and...

...cycle and safety stocks, define the consolidation effect as the percent reduction in average total **inventory** made possible by the consolidation of **inventory** from multiple locations. Assuming that only cycle stocks and safety stocks are carried:

(Equation 3...

...set equal to demand during a certain time period--exhibits no order-quantity effect from **inventory** centralization.

Since the sum of the standard deviations of demand ...widely used. It is also the cornerstone of many currently commercially available software packages for **inventory** control" (Lee and Nahmias 1993, p. 48).(5)

Based on the assumption, noted above for **safety stocks** , that average **total** system **demand** remains the same after consolidation:

(Equation omitted)
So:Now, equations (7) and (8) can be...

...square root law assumptions hold for both safety and cycle stocks, the reduction in total **inventory** caused by consolidation is contingent upon a number of factors besides just the number of...

...the standard deviation of demand (Characters omitted) all have an impact on the reduction in **inventory** .

Further consideration of the proportion variable (W sub ij) reveals the maximum percent reduction in total **inventory** given predetermined values for A, C, 4, L, L, and (Characters omitted). In order to...the consolidation effect is precisely the order-quantity effect, and the ratio of average total **inventory** at the centralized locations to that at the decentralized locations is equal to equation (1...

...consolidation effect is precisely the portfolio effect. In this case, the ratio of average total **inventory** at the centralized locations to that at the decentralized locations is equal to equation (2...

...and S > 0), the consolidation effect is based on the relative sizes of the two **inventory** types.
Holding the level of average total **inventory** constant, as the relative size of the safety stock increases (in other words, cycle stock decreases), the consolidation effect increases (i.e., **inventory** savings due to consolidation increase). Hence, when the limiting assumptions of the square root law hold, greater gains from **inventory** consolidation can be obtained when safety stocks represent the preponderance of **inventory** to be centralized. Figure 1 displays this finding graphically: as the ratio of cycle stock...

...given number of locations (both decentralized [n] and centralized [m]), the percent reduction in total **inventory** decreases (of remains the same when m = 1).

Figure 1 also shows that, as the...

...locations and constant ratio of cycle stock to safety stock, the percent reduction in total **inventory** increases (or remains the same when Q sub EOQ /S = 0).Further, Figure 1 demonstrates...

...locations and constant ratio of cycle stock to safety stock, the percent reduction in total **inventory** again increases.
V. The Replacement Principle And The Square Root Law

In many situations, EOQ...

...omitted) = safety stock (based on variable demand only).

In this model, the only reduction in **inventory** due to consolidation occurs with regard to safety stock. Similar to the square root law...

...relative size of safety stock increases (Q sub Rep /S decreases), the percent reduction in **inventory** increases (holding average total **inventory** constant). Figure 2 shows this graphically and also shows that, as the number of decentralized locations (n) increases, ceteris paribus, the percent reduction in total **inventory** increases. (Figure 2 omitted) As Evers and Beier (1993) have noted, assuming m < n, the reduction in **inventory** is independent of the number of centralized locations (m).

VI. Conclusions

The two square root...

...not hold. Nevertheless, these models represent important steps to understanding the impact of consolidation upon **inventory** requirements.

The fundamental notion that the number of locations impacts **inventory** levels still holds. The fewer the number of centralized locations (in the case of the...

...of decentralized locations (in either square root law case), the greater the percent reduction in **inventory** . However, the models also suggest that different types of **inventory** are affected differently by consolidation. When the limiting assumptions are made, safety stocks produce greater

savings in **inventory** reduction stemming from consolidation than cycle stocks do. In addition, cycle stocks determined by the EOQ approach offer the opportunity for **inventory** reduction due to consolidation that cycle stocks determined by the replacement approach do not.

For...

...it is important to note that, when the square root law assumptions hold in an **inventory** consolidation, the square root law is applicable only once. After the first consolidation, the correlations...

...partitioned equally across all centralized facilities.

References

Ballou, R. H. (1981), "Estimating and Auditing Aggregate **Inventory** Levels at Multiple Stocking Points," Journal of Operations Management, v. 1, pp. 143-153.

Chang...

...Graves, A. H. G. Rinnooy Kan, and P. H. Zipkin, Eds., Logistics of Production and **Inventory** , Amsterdam: North-Holland, pp. 3-55.

Mahmoud, M. M. (1992), "Optimal **Inventory** Consolidation Schemes: A Portfolio Effect Analysis," Journal of Business Logistics, v. 13, pp. 193-214.

Maister, D. H. (1976), "Centralisation of **Inventories** and the 'Square Root Law'," International Journal of Physical Distribution, v. 6, pp. 124-134.

Mehrez, A., and A. Stulman (1983), "Another Note on Centralizing a Multi-Location One Period **Inventory** System," Omega, v. 11, pp. 104-105.

Osteryoung, J. S., E. Nosari, D. E. McCarty, and W. J. Reinhart (1986), "Use of the EOQ Model for **Inventory** Analysis," Production and **Inventory** Management, v. 27 (Third Quarter), pp. 39-46.

Reynolds, J. I., and F. P. Buffa...

...and Safety Stock: A Clarification," Transportation Journal, v. 19, pp. 82-88.

Ronen, D. (1990), " **Inventory** Centralization/Decentralization--The 'Square Root Law' Revisited Again," Journal of Business Logistics, v. 11, pp. 129-138.

Schwarz, L. B. (1981), "Physical Distribution: The Analysis of **Inventory** and Location," AIIE Transactions, v. 13, pp. 138-150.

Smykay, E. W. (1973), Physical Distribution...

...Operational Research Society, v. 38, pp. 827-832.

Tallon, W. J. (1993), "The Impact of **Inventory** Centralization on Aggregate Safety Stock: The Variable Supply Lead Time Case," Journal of Business Logistics...

...89-92.

Zinn, W., M. Levy, and D. J. Bowersox (1989), "Measuring the Effect of

Inventory Centralization/Decentralization on Aggregate Safety Stock: The 'Square Root Law' Revisited," Journal of Business Logistics...

...14.

Zinn, W., M. Levy, and D. J. Bowersox (1990), "On Assumed Assumptions and the **Inventory** Centralization/Decentralization Issue," Journal of Business Logistics, v. 11, pp. 139-142.

Endnotes

1. For...

14/3,K/42 (Item 39 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01004567 96-53960
Warehouse location under service-sensitive demand
Ho, Peng-Kuan; Perl, Jossef
Journal of Business Logistics v16n1 PP: 133-162 1995
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 5480

...TEXT: network involves many interdependent decisions that can be classified into three components: facility, transportation, and **inventory** decisions. The decisions related to each of the three components affect not only the cost...

...In order to provide an accurate representation of the relationship between demand and customer service, **inventory** decisions (primarily those related to the levels of safety stock at the warehouses) should be...

...explicitly in warehouse location models. Warehouse location models should represent the interdependence between location and **inventory** decisions and their combined effect on customer service.

The purpose of this article is twofold...
...demand and compares this behavior to that under inelastic demand.

INTERDEPENDENCE AMONG WAREHOUSE LOCATION DECISIONS, **INVENTORY** DECISIONS, CUSTOMER SERVICE, AND DEMAND

In order to develop a warehouse location methodology that properly represents service-sensitive demand, we must fully understand the interdependence between warehouse location decisions, **inventory** decisions, customer service, and demand. A schematic representation of the relationships between those components is...

...analysis of these relationships is divided into three parts: (1)interdependence between warehouse location and **inventory** decisions, (2) effect of warehouse location and **inventory** decisions on customer service, and (3) effect of customer service on demand. The effect of demand on warehouse location and **inventory** decisions has long been recognized and represented in existing warehouse location and **inventory** models, and is therefore not discussed. Figure 1 also makes a distinction between relations (effects...

...imply constraints on the set of potential network configuration.

Interdependence Between Warehouse Location Decisions and **Inventory** Decisions

Perl and Sirisoponsilp(4) conducted a detailed analysis of the interdependence between warehouse location decisions and **inventory** decisions. Warehouse location decisions affect **inventory** decisions in several ways. First, the number of warehouses affect the overall level of safety...

...stock increases. Second, the allocation of markets (demand points) to warehouses affects the sizes of **inventories** at various warehouses. Finally, the number and locations of the warehouses affect the distances between...

...replenishment lead times, both of which increase the levels of safety stocks at the warehouses. **Inventory** decisions ...effect on warehouse location decisions. For instance, a decision to reduce the overall level of **inventory** in the system, particularly the level of safety stock, would lead to **inventory** consolidation and therefore fewer established warehouses.

Effects of Warehouse Location and **Inventory** Decisions on Customer Service
Both warehouse location and **inventory** decisions have significant effects on customer service. First, warehouse location decisions determine the distances between...

...thereby reducing product availability for any pre-specified levels of safety stock at the warehouses.

Inventory decisions affect customer service primarily through their effect on product availability. The total system **inventory** affects the system-wide level of product availability, while the safety stock level at any particular warehouse affects product availability at that facility. The decisions regarding the **inventory** control discipline at the warehouses influence product availability through their effect on demand variability during the replenishment cycle. Of the two most common **inventory** control disciplines, periodic review would result in higher variability of demand during the replenishment cycle...

...demand. Similarly, both the length and variation of order cycle time affect the cost of **inventory** and product availability faced by the down-stream supplier, due to their effects on demand...

...requirements. First, it should represent the proper elements of the interrelationships among warehouse location decisions, **inventory** decisions, customer service, and demand, as discussed in the previous sections. Second, it should allow us to represent the demand mathematically in terms of warehouse location and **inventory** decisions. Third, it should capture the most important elements of customer service. Finally, the demand...

...product availability and order cycle time, both of which are affected by warehouse location and **inventory** decisions. Therefore, product availability and order cycle time are selected as the service elements to ...

...order cycle time, and (2) they are expressed mathematically in terms of warehouse location and **inventory** decisions. The formulations of the service variables for product availability and order cycle time are...

...I), the values of Q sub i and K sub i depend on transportation and **inventory** decisions, such as the transportation mode for trunking operation, safety stock level, etc. For any given transportation and **inventory** decisions, the value Q sub i and K sub i can be computed. The standard...of the SSWLP model is as follows:
Max Total profit = Revenue -- (Warehouse Cost + Transportation Cost + **Inventory** Cost + Production Cost),

subject to the following constraints:

(1 each market may be served only...than under the Constant elasticity function, i.e., there should be a greater degree of **inventory** consolidation when the demand is less sensitive to service.

The results of Table 7 show that an increase in the required level of **safety stock** has relatively little effect on the profit maximizing configuration of warehouses. By contrast, there is significant increase in the number of warehouses and the **total demand** to be served, from a 10% increase in product price. Certain markets that could not...

...size reduces the number of established warehouses. There needs to be a greater degree of **inventory** consolidation from an increase in replenishment size, when the demand is less sensitive to service...

...profit maximizing configuration of warehouses. The proposed methodology considers the interdependence between warehouse location decisions, **inventory** decision, customer service, and demand. The demand of each market responds to two customer service...

...Both of these two elements can be expressed in terms of warehouse location decisions and **inventory** decisions. Product availability is represented by the fraction of unsatisfied demand.

We presented an analysis...no. 2 (1985):

4 Jossef Perl and Sompong Sirisoponsilp, "Interdependence Between Facility Location, Transportation and **Inventory** Decisions in the Design of Distribution Networks," International Journal of Physical Distribution and Material Management...

14/3,K/43 (Item 40 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00975911 96-25304
Practical production scheduling with capacity constraints and dynamic demand: Family planning and disaggregation
Allen, Stuart J; Schuster, Edmund W
Production & Inventory Management Journal v35n4 PP: 15-21 Fourth Quarter 1994
ISSN: 0897-8336 JRNL CODE: PIM
WORD COUNT: 2948

...TEXT: are based on a 33 mhz, 486, EISA architecture with no math coprocessor.

SYSTEM OVERVIEW

Inventory Planning Model (IPM)

This is the existing scheduling system; one of its functions is to...for I(i, t):

(Equation omitted)
where I(i, 0) are the end-item beginning **inventories** . Now substitute for I(i, t) in the objective function (9) and in the buffer...

...constraints and round the right-hand sides to integer values with an eye toward beginning **inventory** values. We are, in effect, overriding the buffers suggested by IPM. This will be self...

...are nothing more than a generalized form of the feasibility conditions that arise in every **production** planning problem: [redacted] in any period must be at least as large as [redacted] in that period. The modific[redacted] in (12) simply net out beginning [redacted] and add [redacted] .

APPLICATION OF THE SCHEDULING MODELS

We will demonstrate the use of these models with data...without holding and setup costs accounted for. (Table 4 omitted) The results for the ending **inventories** , I(i, t), and production in units, P(i, t), must be computed "outside" the...

...t), has resulted in some "overproduction" in the first week. This will produce some excess **inventory** , which will be remedied the next time the schedule is run.

When family four, containing...

...A Deterministic Spreadsheet Simulation Model for Production Scheduling in a Lumpy Demand Environment." Production and **Inventory** Management Journal 31, no. 1 (1990): 39-42.

4. Vollman, T. E., W. L. Berry...

...for family i, $ / unit

CS(i) = setup cost for family i, $ / setup.

I(i, t) = **inventory** level of family i at the end of period t, units

P(i, t) = regular...

14/3,K/44 (Item 41 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00901316 95-50708
Lead-time models of business processes
Bartezzaghi, Emilio; Spina, Gianluca; Verganti, Roberto
International Journal of Operations & Production Management v14n5 PP: 5-20 1994
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 6133

...TEXT: as the major trade-off shifter between some performances traditionally regarded as antithetical, for example **inventory** turnover

and customer service. In addition, lead-time reduction can displace the specific trade-off...PR, (1)

where WIP is the level of work-in-process and PR is the **production** rate. Note that **total** lead time reduction does not necessarily require the optimization of the single time-lags, since...

...the management time, the longer the work-in-process time, because a higher level of **safety stocks** should be held to cope with the increased time-lag from forecast to delivery. On the contrary, a more accurate demand forecast is aimed at reducing the **safety stock** level and often requires longer management time. In this case, the longer the management time...

...any stockless processes, while the buffer model is suitable for the processes which hold decoupling **inventory** buffers. As a consequence, referring to the previous taxonomy, the choice of a line model...1993, pp. 93-102.

22. Karmarkar, U.S., "Lot Sizes, Lead Times and In-process **Inventories** ", Management Science, Vol. 33 No. 3, 1987, pp. 409-18.

23. Alonso, R.L. and...

...pp. 7-12.

32. Heard, E. and Plossl, G.W., "Lead Times Revisited", Production and **Inventory** Management, Third Quarter, 1984, pp. 32-47.

33. Plossl, G.W., "Throughput Time Control", International...

14/3,K/45 (Item 42 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00898117 95-47509
Total effectiveness in a just-in-time system
Karlsson, Christer; Norr, Christer
International Journal of Operations & Production Management v14n3 PP: 46-65 1994
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 8588

...TEXT: demands:

* smaller shipment size and increased delivery frequency;

* increased number of direct shipped articles;

* decreased **inventory** ;

* increased flexibility in production processes.

Which in its turn will have influence on:

* transportation frequency...
...plant. Long transportation distances will increase not only transportation times but also the costs of **inventory** during transportation and, most important, the variance of arrival time.

An alternative to geographical proximity...become an important time component. The greater the variations in arrival times, the larger the **buffer stocks** have to be in order to ensure a steady production flow. The new situation means that the relative part of transportation time of the **total** time between **production** units has increased. It is true that the transportation time in itself has decreased through...

...them[16]. Modern MA-thinking implies, however, that one of the easiest ways of reducing **inventory** carrying costs, is to store as much materials and components as possible, as early as...supplier. The risk is then that this unit will have to take on an increased **inventory** cost. But since the gains later in the system will be larger than the increased...

...causing unnecessary stocks for both parties. With an effective JIT system one can decrease the **inventory** for both parties with lower **inventory** carrying costs as a consequence. Increased capital tied up with suppliers due to larger stocks...
...manufacturing and transportation systems in order to decrease capital costs through the avoidance of unnecessary **inventory** and loss of time. It is therefore also no coincidence that the automobile industry has...

...large OEM companies in the end of the manufacturing chain to transfer the problems of **inventory** costs etc. onto their suppliers. We also hoped to understand how the implementation of JIT...took four hours. The containers that had been approved, were then shipped to a buffer **inventory** , from which deliveries were made to a storage area and a new buffer **inventory** . The elbow-rests were then reloaded into special containers suited for the racks in connection...

...process steps were needed in the Trollhattan plant just for this operation and the buffer **inventory** lasted 21 days (see Figure 1).(Figure 1 omitted)

The pilot project necessitated a fundamental...

...one-card kanban system.

For the Trollhattan plant this has been a tremendous improvement financially. **Inventory** turn-over has risen threefold -- from 10 to 32 times even with an increased volume...

...as a result of a better mix of elbow-rests at the suppliers finished goods **inventory** . By far the largest savings (over 60 per cent) resulted from an enhanced operation economy...

...half due to shorter lead times from the supplier (two instead of 21 days), pipeline **inventory** was reduced by 25 per cent due to the elimination of a number of operations (mostly unnecessary transportation, reloading and inspection) and cycle **inventory** decreased due to smaller batches (more frequent transportation and smaller containers). Saab estimated that 45 per cent of the total **inventory** reduction was caused by more frequent deliveries and 30 per cent was due to the...

...the elbow-rests are then cleaned and finished, before they are delivered to finished goods **inventory** . The traditional and the simplified manufacturing processes, within the Kristinehamn plant, are shown in Figure ...

...divided into administrative and technical innovations. The most important administrative steps, in order to reduce **inventory** levels, are

the reduction of batch size in the moulding process (by 40 to 70 per cent) and the adoption of a kanban-card scheduling system. The **inventory** levels are ...order from Saab in Trollhattan is at hand. The kanban system has not only decreased **inventory** levels. An increased information flow between the OEM factory and the supplier has resulted in a better mix of elbow-rests, both in production and finished goods **inventory** , due to better forecasts accuracy. The **inventory** level of each item is now in conformity with actual demand and not in accordance with some crude forecast. In the old system **inventory** levels of some items were normally high while others were lacking due to changed demands. As a result the finished goods **inventory** has not risen but decreased (a 55 per cent reduction in volume despite an increase of sales of 25 per cent), **inventory** turnover has risen twofold and through-put time has decreased from 32 to 16 days...

...process is now managed by the fork-lift operators themselves, who act on changes in **inventory** levels. The in-process **inventory** , between setting and finishing, as well as the finished goods **inventory** are thus acting as kanban-buffers with direct control of the loading jobs.

Another improvement...

...as a better co-ordination of working hours, in order to streamline operations and avoid **inventory** build-ups.

To summarize this case, it clearly shows that a JIT system need not...more accurately to the Volvo demand forecast. Thus, Sunwind has been able to reduce inbound **inventory** by 50 per cent. Approximately ten days before the expected production order, Volvo sends a...

...Sunwind plant in Save. By reducing set-up times Sunwind had been able to transfer **inventory** backwards and the **inventory** today consists mostly of raw materials and sub-assemblies, which have made further reductions in **inventory** costs possible.

The most interesting effect of the reduction in set-up time is that... merely a redistribution had taken place. To our surprise a study of total level of **inventory** costs, inbound deliveries of raw materials and sales for the Sunwind plant shows a decrease...

...the suppliers would probably have a greater chance of reducing their carrying costs for holding **inventory** because they now have a better mix of products at their finished goods **inventory** . It must also be stated that the cost of holding **inventory** decreases the nearer to the raw material side of the production chain we get. Sunwind has also been successful in reducing their own WIP **inventory** by the reduction of set-up times. The WIP **inventory** has decreased from one week of **inventory** to one-and-a-half days, while the raw materials **inventory** has decreased from six to three weeks. However, this reduction is due, partly, to the increased quality concern within the plant, which also has a positive influence on **inventory** levels.

The adoption of JIT principles has tied Sunwind's operations much closer to those...

...each party are as follows:

(1) From the point of view of Volvo:

* Reduction of **inventory** costs (**inventory** reduction from four to zero

days, due to more frequent deliveries).

* Reduced demand for space...

....quality.

* Increased cost awareness among personnel which has led to further rationalizations, better controls of **inventory** and WIP and better time precision in production.

* Increased capital turn-over.

* Increased publicity as...A.T., Sarhan, M.H. and Camp, R.A., "The Impact of Just-in-Time **Inventory** Systems on Small Business", Journal of Accountancy, January 1987.

17. Goyal, S.K., "An Integrated **Inventory** Model for a Single Supplier-Single Customer Problem", International Journal of Production Research, Vol. 15...

14/3,K/46 (Item 43 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00881237 95-30629
Flexible "consumer response"
Armfield, Jerry
Apparel Industry Magazine v55n7 PP: 16-18 Jul 1994
ISSN: 0192-1878 JRNL CODE: ANM
WORD COUNT: 1252

...DESCRIPTORS: **Inventory** management

...ABSTRACT: that must be addressed to ensure flexibility is the elasticity of capacity, which means that **inventory** safety stocks must be expanded to meet adverse demand/capacity balances. ...
...TEXT: produce apparel products faster. Progressive bundle units have been replaced with unit production systems, managed **inventory** lines and varying modular or work cells concepts that require employees to acquire multiple skills...

...comparisons are made for sewing processes that include progressive bundle units, unit production systems, managed **inventory** lines, two types of modular systems, and a single unit pass-through modular process. UPS...

...subject to turnover.

In the future service demand scenario, a limited flexible capacity means that **inventory safety stocks** must be expanded to meet adverse demand/capacity balances. As the consumer demands personalized offerings and customized fashion products, the manufacturing capacity must be more flexible because **inventory** cannot **totally** solve the consumer **supply** dilemma. Achieving this elasticity in capacity has not yet been addressed by the apparel industry...content work force. This elasticity and velocity of production will greatly reduce the requirements for **safety stocks inventory** , which by the nature of the emerging supply chain, will be harder to forecast.
The...

14/3,K/47 (Item 44 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00861790 95-11182
Just-in-time manufacturing: Its impact on UK stock ratios
Procter, Stephen J
Logistics Information Management v7n1 PP: 41-48 1994
ISSN: 0957-6053 JRNL CODE: LIM
WORD COUNT: 4666

...DESCRIPTORS: **Inventory** control
...TEXT: narrowest conception of the term, JIT can be regarded as a system of stock or **inventory** control. The necessary consequence of producing, assembling and receiving goods just in time is that...

...of the most successful parts of Japanese manufacturing industry. It can be considered alongside cellular **manufacture** , **total** quality management (TQM), and the development of co-operative rather than adversarial buyer-supplier relations...

...flows required by JIT[3,4]. Similarly, TQM is necessary once the comfort of the **buffer** provided by **stocks** is removed[5], while adversarial supplier relations would render redundant any internal progress towards JIT
...Hidden Lessons in Simplicity, Free Press, New York, NY, 1982.
2. Waters, C.D.T., **Inventory** Control and Management, John Wiley, Chichester, 1992.

3. Hassard, J.S. and Procter, S.J...

...ed., Blackwell, Oxford, 1992.

12. Economic Trends, Annual Supplement, HMSO, London, 1993.

13. Abramovitz, M., **Inventories** and Business Cycles, National Bureau of Economic Research, New York, NY, 1950.

14. Klein, L.R. and Popkin, J., "An Economic Analysis of the Post War Relationship between **Inventory** Fluctuations and Change in Aggregate Economic Activity", **Inventory** Fluctuation and Economic Stabilization, The Joint Economic Committee, Washington DC, 1961.

15. Lundberg, E., Studies...

...Expansion, P.S. King & Sons, London, 1937.

16. Metzler, L., "The Nature and Stability of **Inventory** Cycles", Review of Economic Statistics, Vol. 23, August 1941, pp. 113-29.

17. Monden, Y...

14/3,K/48 (Item 45 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00823698 94-73090
A multiple objective model for a just-in-time manufacturing system environment

Kim, Gyu Chan; Schniederjans, Marc J
International Journal of Operations & Production Management v13n12 PP: 47-61 1993
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 3767

...TEXT: production systems.

An increasing number of companies have adopted JIT to reduce the cost of **inventory** investment, storage, and handling. According to Schonberger[10] and Wantuck[11], the JIT production system...

...of products at predetermined points in time. This approach limits the size of both the **inventories** and the workforce, thereby achieving increased productivity and reduced costs[10]. In order to develop...

...4. Achieve the minimum number of kanbans. Since the number of kanbans expresses the maximum **inventory** of a part, this goal would seek to keep the number of ...increased (i.e. d sub n) or decrease (i.e. d sub n) when actual **demand** changes. Since the **total** number of kanbans is fixed, each line should reduce its cycle time to adjust for the deviation in the kanbans. However, a line incapable of adjusting might increase the **safety stock** (F sub ij) or the total number of kanbans to adapt to a demand increase...

14/3,K/49 (Item 46 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00813089 94-62481
The effect of capacity limitations on safety stock
Mapes, John
International Journal of Operations & Production Management v13n10 PP: 26-33 1993
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 2125

...DESCRIPTORS: **Inventory** control
...TEXT: 2]. Several authors have shown how excess capacity can reduce levels of work-in-process **inventories** [3-6].

South and Hixson[7] have demonstrated that not only does excess capacity reduce work-in-process **inventories** but also the same level of customer service can be maintained with less finished goods **inventory** . This is because, when demand is higher than expected, more of this demand can be...

...planning problem, trying to develop decision rules which will minimize the sum of production and **inventory** costs over a given planning horizon[9,10,11]. While the methods used provide a...
...quantify the relationship between excess capacity, safety stock and service level in a periodic review **inventory** system. The results demonstrate that, as capacity utilization approaches 100 per cent, substantial increases in...

...will occur. For most organizations, a better measure of customer service is the proportion of **total** **demand** met from stock. Brown[12] has developed a method for calculating **safety** **stock** when customer service level is measured in this way. It uses the concept of partial expectation. If **safety** **stock** is a multiple k of the standard deviation of demand

during the planning period, then...used to make a range of different products.

REFERENCES

1. Plossl, G.W., Production and **Inventory** Control principles an And Techniques, 2nd ed., Prentice-Hall, Englewood Cliffs, NJ, 1985.

2. Hall, R.W., Zero **Inventories** , Dow Jones-Irwin, Homewood, IL, 1983.

3. Fox, R.E., "MRP, Kanban and OPT--What's Best", American Production and **Inventory** Control Society 25th Annual International Conference Proceedings, 1982, p. 484.

4. Gue, F.S., Increased...56-7.

5. Kanet, J.L., "Towards Understanding Lead Times in MRP Systems", Production and **Inventory** Management, Third Quarter, 1982, p. 9.

6. South, J.B., "Continuous Excess Capacity Versus Intermittent Extra Capacity to Control Average Queue Size in a Random Environment", Production and **Inventory** Management, First Quarter, 1985, pp. 103-10.

7. South, J.B. and Hixson, R., "Excess Capacity Versus Finished Goods Safety Stock", Production and **Inventory** Management, Third Quarter, 1988, pp. 36-40.

8. Holt, C.C., Modigliani, E and Simon, H.A., "Planning Production, **Inventories** and Work Force", Prentice-Hall, Englewood Cliffs, NJ, 1960.

9. Bowman, E.H., "Consistency and...

...Aggregate Scheduling Problem", Management Science, 14 February 1968.
12. Brown, R.G., Decision Rules for **Inventory** Management, Holt, Rinehart and Winston, New York, NY, 1967.

14/3,K/50 (Item 47 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00725129 93-74350
The Effect of Autocorrelated Demand on Customer Service
Zinn, Walter; Marmorstein, Howard; Charnes, John M.
Journal of Business Logistics v13n1 PP: 173-192 1992
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 4472

...DESCRIPTORS: **Inventory** management
...TEXT: autocorrelation of daily demands is often present, it frequently goes undetected or is ignored by **inventory** managers. Therefore, the purpose of this paper is to explain and quantify the effect of...

...In order to manage the opportunity cost of stockouts, firms must maintain a level of **safety stock** that balances the loss of sales and customer goodwill with the cost of carrying **inventories** .(1) The complete associated with this decision stems from the fact that both daily demand...

...customers and lead time from suppliers can vary. The greater the variability, the larger the **safety stock** needed. The level of

variability is measured by the variance of lead time demand. Lead time **demand** is defined as the **total** quantity demanded by customers during a lead time. The variance of lead time demand is...1 and 2 indicate that they affect safety stock when the standard approach to determining **inventory** is used.

Note in Table 1 that the variability of both the demand and the...

...autocorrelated demand on customer service when that fact goes undetected or is ignored by the **inventory** manager. A second objective is to identify the circumstances under which the effect of autocorrelation...a result, this research reinforces the importance of using demand forecasts in the management of **inventories** , with the proviso that firms using packaged forecasting techniques evaluate how well their chosen techniques...

...increase across all conditions is 18.1 percent.

NOTES

1 See, for instance, K. Howard, " **Inventory** Management in Practice," International Journal of Physical Distribution and Materials Management 14, no. 2 (1984): 3-36; D. P. Herron, "Integrated **Inventory** Management," Journal of Business Logistics 8, no. 1 (1987): 96-116; or J. E Campbell, "Designing Logistics Systems by Analyzing Transportation, **Inventory** and Terminal Cost Tradeoffs," Journal ...1 (1990): 159-179.

2 R. B. Fetter and W. C. Dalleck, Decision Models for **Inventory** Management (Homewood, Ill.: Richard D. Irwin, Inc., 1961).

3 Two measures of service are adopted...

...4 J. T. Mentzer and R. Krishnan, "The Effect of the Assumption of Normality on **Inventory** Control/Customer Service," Journal of Business Logistics 6, no. 1 (1985): 101-120.

5 H. Lau, "Toward an **Inventory** Control System Under Non-Normal Demand and Lead-Time Uncertainty," Journal of Business Logistics 10...

...J.: Prentice Hall Inc., 1985), pp. 101-102.

15 R. G. Brown, Statistical Forecasting for **Inventory** Control (New York: McGraw Hill, 1959), pp. 54-59.

16 H. V. Roberts, Data Analysis...

...degrees from Michigan State University. His current research interests are in the areas of postponement, **inventory** management, and the interface between marketing and physical distribution.

Howard Marmorstein is assistant professor in...

14/3,K/51 (Item 48 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00709667 93-58888
The impact of inventory **centralization on aggregate safety stock: The variable supply lead time case**
Tallon, William J

Journal of Business Logistics v14n1 PP: 185-203 1993
ISSN: 0735-3766 JRNL CODE: JBL
WORD COUNT: 3904

The impact of inventory **centralization on aggregate safety stock: The variable supply lead time case**

DESCRIPTORS: **Inventory** management...

...ABSTRACT: In addition, a measure called the portfolio effect has been proposed to describe the aggregate **inventory** savings across various levels of demand deviations and sales correlations. The proposed portfolio effect model...

...or replenishment lead times are uncertain or variable. The analysis indicates that centralization of product **inventory** will reduce aggregate safety stock levels under uncertainty. Demand and supply management activities can reduce...
TEXT: Classical **inventory** theory illustrates that the levels of **inventory** and customer service are directly related.(1) In other words, maintaining larger stocks of product in **inventory** increases the probability that an item will be available when requested by the customer. The...

...stocking out of a product is generally achieved by maintaining a safety stock quantity in **inventory** equal to a number (k) of standard deviations of the relevant demand distribution.(2) This...

...level of stockout protection.

sigma sub di = standard deviation of demand for product i.

The **safety stock** for a specific product at a single stocking location can be computed directly. assuming there...

...Since normally distributed forecast errors are assumed by this model, the level of protection and **safety stock** can be controlled directly by the selection of k. For example, a 5% probability of stocking out is achieved by maintaining a **safety stock** of 1.645 (k, from the normal probability distribution table) times the standard deviation of expected **demand** for the product. The **aggregate** level of **safety stock** required at one stocking location would be the summation of the **safety stocks** for the individual product items at the facility.

THE "SQUARE ROOT LAW"

Centralizing the **inventory** of product items, thereby reducing the number of stocking locations, affects the standard error component...

...e., stockout probability, can be maintained with lower centralized stocks when compared to multiple decentralized **inventories** .

This phenomenon of reduced demand variability resulting from centralization has been referred to as the...

...stock by about 33% (from 1,399 units to 934 units). The same percentage of **inventory** savings would be realized, regardless of the level of stockout protection, or k value, selected...

...more locations that are centralized, the greater the potential for

safety stock savings from centralizing **inventory** to fewer locations.
THE IMPACT OF DEMAND CORRELATION

Further research has shown that the relationship between **inventory** centralization and aggregate safety stock level is a function not only of the respective standard...

...stock from centralization. The more negative the demand correlation between the locations, the higher the **inventory** savings from centralization. The impact of the sales correlation on the percentage savings in aggregate...

...1, and determining the safety stock savings as compared to the sum of the decentralized **inventories** . This figure illustrates that as the sales correlation for an item between two locations approaches...be established between the extremes of zero and the sum of the decentralized safety stock **inventories** .

THE PORTFOLIO EFFECT MODEL

Zinn, Levy, and Bowersox have shown that not only the sales...

...locations. These researchers have proposed a measure, called the Portfolio Effect, to describe the aegregate **inventory** savings across various levels of magnitudes and sales correlations. This measure of predicted safety stock...

...savings in aggregate safety stock across all sales correlations; larger magnitudes will produce smaller percentage **inventory** savings. The closer the sales correlation is to -1, the greater the impact of a...

...magnitude on the Portfolio Effect.

The Portfolio Effect model is based on four assumptions: (1) **inventory** transfers between locations at the same level are not common, (2) customer service level is...of safety stock savings. The second issue studied was the expected impact on magnitude, hence **inventory** savings, resulting from the reduction of lead time variability under various levels of demand uncertainty...

...from consolidation unless a negative sales correlation exists. Also, the more modest the goals for **inventory** savings, in terms of lower Portfolio Effect expectations, the less impact sales correlation and magnitude...for the other.
MANAGERIAL IMPLICATIONS

This paper studied the impact of centralizing stocking locations on **aggregate** safety sock when both **demand** and replenishment lead times are uncertain. An enhanced Portfolio Effect model was proposed to predict aggregate **safety stock** savings under various operation conditions. The results of this study provide important insights to managers considering stocking location consolidation.

The centralization of product **inventory** will reduce aggregate safety stock levels in an uncertain environment. However, the lower level of...

...simultaneously.

Demand and supply lead time variability have major impacts on the required levels of **aggregate safety stock** . **Demand** and supply management

activities, including contractual agreements with both customers and suppliers, can reduce the levels of uncertainty faced by the firm. This reduced uncertainty can lower decentralized **safety stock** requirements and maximize the potential savings from centralization.

The **inventory** centralization decision requires an understanding of the opportunities and constraints faced by the firm. The...

...level of safely stock savings to be expected from centralizing product from two locations. Product **inventories** discovered to result in large savings from centralization would provide opportunities for **inventory** cost reduction. The **inventories** resulting in low savings from centralization would provide opportunities for improved customer service, through decentralization, with minimal increases in aggregate **inventory** .

The enhanced Portfolio Effect model can be used to develop a priority ranking of candidate...

...from product consolidation decisions.

NOTES

1 R. Peterson and E. A. Silver, Decision Systems for **Inventory** Management and Production Planning (New York: John Wiley & Sons, 1979), pp. 223-225.

2 Same reference as Note 1.

3 D. H. Maister, "Centralization of **Inventories** and the 'Square Root Law,'" International Journal of Physical Distribution & Materials Management 6, no. 3...

...498-501.

5 W. Zinn, M. Levy, and D. J. Bowersox, "Measuring the Effect of **Inventory** Centralization/Decentralization on Aggregate Safety Stock: The 'Square Root Law' Revisited." Journal of Business Logistics...

14/3,K/52 (Item 49 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00700475 93-49696
Cost savings for inbound freight: The effects of quantity discounts and transport rate breaks on inbound freight consolidation strategies
Russell, Randolph M; Cooper, Martha C
International Journal of Physical Distribution & Logistics Management v22n9 PP: 20-43 1992
ISSN: 0960-0035 JRNL CODE: IPD
WORD COUNT: 12325

...TEXT: making it more economical to order items in smaller individual quantities more frequently, thereby reducing **inventory** levels. Such a result is important in achieving maximum benefits from just-in-time (JIT...

...has concentrated on the outbound delivery of finished goods to customers. Economic pressures encourage constraining **inventory** levels throughout both the organization and the supply chain, implying smaller shipments. Alternatively, the savings...group order can result in considerable savings. However, at the same time, JIT and similar **inventory**

reduction techniques have been instituted by many purchasers, causing shippers again, to be moving small...
...basis. Some retailers are requiring multiple shipments per day to individual stores to minimize their **inventories** . This pressure appeared to diminish the value of freight consolidation, since timing was the most ...

...on inbound logistics 5!, concludes with several suggestions for future research, including simultaneous evaluation of **inventory** and transport decisions, improvements in methods for modelling freight rates, review time intervals, and the...

...the quantity discount structure, weight breaks, and demand level?

Brief backgrounds on freight consolidation and **inventory** order/lot sizing are presented as they relate to the multi-product inbound consolidation issue...to consider the best side of the order in conjunction with its shipping characteristics. This **inventory** theoretic approach introduced by Meyer et al. 15! and, later, Baumol and Vinod 16!, and Constable and Whybark 17!, suggests that **inventory** decisions and transport costs are interrelated. Few models consider the **inventory** implications of consolidation. Exceptions include Burns et al. 18!, Blumfeld et al. 19! and Buffa 5!. Burns et al. developed an economic order quantity-based model to minimize transport and **inventory** costs for outbound consolidation. The Blumfeld et al. model, also based on the EOQ, determined both routes and shipment sizes. Some models also consider in-transit **inventory** when comparing transit times of various alternatives, e.g. Cooper 3! and Buffa and Munn...

...systems can be used to incorporate the savings of consolidation with the time sensitivity of **inventory** -constrained systems. However, Swenseth and Buffa 25! indicate that the implementation of just-in-time...

...in increased logistics costs for the manufacturer and vendors from the standpoints of increased transport, **inventory** carrying, and expected stockout costs, yielding as much as a 27 per cent increase. In addition, shipping times and shipping time variability also increased, requiring higher safety stock levels.

INVENTORY LOT SIZING

Much work has been done in the area of determining the best lot size for ordering **inventory** . Usually, this has involved some variation of the economic order quantity. The basic model has...

...breaks, though not all together. The order size determination is based on such factors as **inventory** holding costs and ordering costs, often assumed to be independent of other orders. Thus, effort...

...policies requires that a multi-item lot-sizing model be employed within the framework of **inventory** management decisions. Such a model should be able to take into account the quantity discount...

...as to minimize the total cost of all replenishments. This total cost comprises ordering costs, **inventory** holding costs, item replenishment costs (purchase price times the number of units purchased) and transport...

...stocks are frequently employed to buffer against demand rate uncertainty, thus extending the applicability of **inventory** policies, such as EOQ, that are derived under the assumption of deterministic demand. The

assumption...

...given price level, or the breakpoint quantity, depending on which lot size provides the lowest **total** cost. When the **demand** rate is constant and certain (i.e. no **safety stocks** are required), there is no difference in total cost between an order point system and...references in this area includes 27-30!. Implementation of the policy requires that when the **inventory** level for one item reaches its must-order point, the item is ordered jointly with all other items whose **inventory** levels have dropped below their can-order points. While can-order policies are general in...

...reducing transport costs.

(2) SHAPE OF AGGREGATE DEMAND DISTRIBUTION ACROSS ITEMS

A large collection of **inventory** items typically follow a Pareto-type distribution, where a few items have high demands and...avoidable costs because, even under best case replenishment and transport costs, some ordering costs and **inventory** holding costs must be incurred. Nevertheless, the control costs represent those costs which the purchasing ...

...in the design, the uniform demand distribution is not typical of a larger population of **inventory** items in the business environment.

At the next level, there is complete nesting of a...

...of quantity discount attractiveness (F). Each replication, or batch, consists of a unique collection of **inventory** items that is subjected to identical treatments under price, weight and attractiveness factors, yielding a...observations. To summarize, for each experimental block there are five unique batches, or collections of **inventory** items, that are subjected to repeated treatments of price, weight and attractiveness. Since each experimental...

...attributed to a number of different sources, indicated in Tables IV-VIII. (Tables IV-VIII) **Inventory** holding costs are greatly reduced, with the 82 per cent reduction in the mean time...

...levels of demand make it easier to achieve near-truckload economies, without attendant increases in **inventory** holding costs. When the overall level of demand is low, achieving the truckload rate breakpoint...higher relative savings found in the low demand environment indicate that inbound consolidation facilitates transport, **inventory** and order cost savings that would otherwise be unattainable under independent ordering. However, the higher...

...level of demand is high.

PRICE LEVEL
The policies given by the optimal, multi-item **inventory** model reflect a perception of some managers that transport costs are relatively more important for...

...shipping weights for an item are only achieved by extending the order interval, thereby increasing **inventory** carrying costs. Thus, one control cost category is decreased at the expense of an increase...namely a large number of items having high demand and low discount attractiveness, yielding sizeable **inventory** reductions without sacrificing transport

economies; whereas a favourable quantity discount environment (high demand and attractiveness...

...few higher demand "A" items in the uniform distribution causes an increase in the average **inventory** for the entire population of items. The inclusion of a few "A" items increases the...

...associated with a lengthened TBO, suggesting, in some instances, that it is advantageous to trade **inventory** holding costs for transport cost savings.

The number of groupings, shown in Table V, is...order policies that do not effectively exploit the trade-offs among quantity discounts, transport and **inventory** holding costs, leading to higher operating costs that others in the firm must manage. The...

...orders. Smaller quantities of each item can be ordered with more frequent reorders, thereby reducing **inventory** costs. More items, 25 instead of 10, shortened the time between order placements regardless of... are ordered from the same vendor. A co-ordinated replenishment approach to the multi-item **inventory** problem is shown to be of benefit for purchasing managers. Since a vast majority of...

...costs, making it economically possible to order smaller quantities of each item more frequently, reducing **inventory** costs.

(4) Most importantly, an increase in the shipping volume of each order which can...Engineers, 1984, pp. Cooper:1-7.

15. Baumol, W.J. and Vinod, H.D., "An **Inventory** Theoretic Model of Freight Transport Demand", Management Science, Vol. 16 No. 7, 1970, pp. 413 ...

...348-53.
17. Constable, G.K. and Whybark D.C., "The Interaction of Transportation and **Inventory** Decisions", Decision Sciences, Vol. 9 No. 4, 1978, pp. 688-99.

18. Burns, L.D...

...R.W., Blumfeld, D.E. and Daganzo, C.F., "Distribution Strategies that Minimize Transportation and **Inventory** Costs", Operations Research, Vol. 33 No. 3, May-June 1985, pp. 469-90.

19. Blumfeld...

...Burns, L.D., Diltz, J.D. and Daganzo, C.F., "Analyzing Trade-offs between Transportation, **Inventory** and Production Costs on Freight Networks", Transportation Research B, Vol. 19 No. 5, 1985, pp...

...1989, pp. 828-42.

23. Bagchi, P.K., "Management of Materials under Just-In-Time **Inventory** System: A New Look", Journal of Business Logistics, Vol. 9 No. 2, 1988, pp. 89...
...1984, pp. 720-6.

27. Balintfy, J.L., "On a Basic Class of Multi-Item **Inventory** Problems", Management Science, Vol. 10 No. 2, 1964.

28. Silver, E.A., "A Control System for Co-ordinated **Inventory** Replenishment", International Journal of Production Research, Vol. 12 No. 6, 1974, pp. 647-71.

29. Federgruen, A., Groenevelt, H. and Tijms, H.C., "Co-ordinated Replenishments in a Multi-Item **Inventory** System with Compound Poisson Demands", Management Science, Vol 30 No. 3, 1984, pp. 344-57...

...R. and Iyogun, P.O., "Periodic versus 'Can-Order' Policies for Co-ordinated Multi-Item **Inventory** Systems", Management Science, Vol. 34 No. 6, 1988, pp. 791-6.

31. Britney, R.R...order of an item, with other items, consists of the sum of annual replenishment cost, **inventory** holding costs, line ordering cost and transport costs. Replenishment costs represent the total invoice value of the item being purchased, reflecting any quantity discounts that may be applicable. **Inventory** holding costs are charged against the average **inventory** value of the item. Line ordering costs refer to any item-specific, fixed costs associated...

...i R sub l (2)

where

B sub ikl = the sum of annual replenishment cost, **inventory** holding cost, line ordering cost and transport cost for item i, ordered on order interval...

...interval k,

D sub i = the annual demand for item i,

I sub i = the **inventory** holding cost proportion for item i,

N sub k = the number of orders per year...

...is to develop coordinated replenishment policies that minimize total costs for an entire subset of **inventory** items available from a common supplier. The total cost for this subset of items is...

14/3,K/53 (Item 50 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00655924 93-05145
Structural Approaches to Vector Autoregressions
Keating, John W.
Federal Reserve Bank of St. Louis Review v74n5 PP: 37-57 Sep/Oct 1992
ISSN: 0014-9187 JRNL CODE: FSL
WORD COUNT: 6636

...TEXT: by assuming that the price level is predetermined, except that producers can respond immediately to **aggregate supply** shocks. (Equation 8 omitted) Equation 9 is a reduced-form IS equation that models output...

...a function of nominal GNP and the interest rate. This specification is motivated by a **buffer stock** theory where short-run money holdings rise in proportion to nominal income, yielding the final...Perspectives (Summer 1988), pp. 147-74.

West, Kenneth D. "The Sources of Fluctuations in Aggregate **Inventories** and GNP," Quarterely Journal of Economics (November 1990), pp. 939-71.

Zellner, Arnold. "An Efficient...

14/3,K/54 (Item 51 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00651609 93-00830
Planning Capacity Utilization in an Assemble-to-Order Environment
Marucheck, Ann; McClelland, Marilyn
International Journal of Operations & Production Management v12n9 PP: 18-38 1992
ISSN: 0144-3577 JRNL CODE: IJO
WORD COUNT: 7204

...TEXT: plays a major role in improving profitability compared with other strategic variables including market share, **inventory** , vertical integration and industry growth. This research explores the strategic decision of setting a planned...

...for Make-to-Stock (MTS) firms, such as smoothing production rates and/or maintaining buffer **inventories** of finished goods. The MTO environment's volatility and unpredictable demand are just two factors...

...variability experienced across a broad product line;

(2) smaller production volumes;
(3) ineffectiveness of holding **inventories** of finished goods and WIP to buffer demand uncertainty; and;

(4) service goals which dictate...the MRP schedule, and an item value. The item value will be used to evaluate **inventory** levels as a base for evaluating total system performance at different levels of capacity utilization...

...volumes. If the lot-sizing rule is based on setup times, then work in process **inventories** may be inflated by cycle stocks of end items, subassemblies and fabricated parts created only to rationalize setup costs. These inflated **inventories** may not be needed to meet actual customer demand in the foreseeable future and thus remain indefinitely in **inventory** , eliminating the economies of batching. Secondly, Spence and Porteus 12! have shown analytically that reduced...the planned process lead time and a standard deviation of one week.

On average the **cumulative manufacturing** lead time is 13 weeks. In order to obtain competitive order lead times, **safety stocks** of purchased parts are held and purchase of raw materials and fabrication of parts begin ...
...capacity utilization level and the firm's manufacturing performance relative to various customer-service and **inventory** criteria given the two demand patterns for customer orders. In a full factorial design 18 measure is the amount of WIP, which includes all **inventory** in transit, in queue, and in process. The **inventory** values used to calculate WIP are in Table I. The WIP measure provides insight into the cost of achieving customer service goals in the form of **inventory** investment and congestion within the manufacturing operation.

In addition, average lateness of an order is...which can ultimately erode the firm's profitability, and the reduced customer service and increased **inventory** levels that are associated with operation at near or full capacity. To determine the most...

...simulation results into a single measure is demonstrated. The basis for assessing costs is the **inventory** valuation system previously discussed and displayed in Table I. At each level of capacity utilization...

...cost of lost sales.

The total cost also includes the carrying cost of the WIP **inventories** as reported in Table III. These costs are assumed to have an implicit cost factor of 1. Thus, the total weekly cost is expressed in **inventory** value units and is the sum of idle capacity, late orders, and WIP.

Values of...

...responding to fluctuating demand for end items. (See 3,4,29! for further discussion positioning **inventory** relative to the structure of the bill of materials.) The cost of each capacity-utilization...A.S. and McClelland, M.K., "Strategic Issues in Make-to-Order Manufacturing", Production and **Inventory** Management, Vol. 27 No. 2, 1986, pp. 82-96.

5. Hendry, L.C. and Kingsman...

...1987, pp. 245-58.

9. Karmarkar, U.S., "Lot Sizes, Lead Times and In-Process **Inventories** ", Management Science, Vol. 33 No. 3, 1987, pp. 409-18.

10. Olhager, J. and Rapp...

...M.S., "Scheduling Components for Group Technology Lines (A New Application for MRP)", Production and **Inventory** Management, Vol. 21 No. 4, 1980, pp. 43-9.

14. Spencer, M.S., "Balancing Run Sizes for Optimum Capacity Utilization", Production and **Inventory** Management, Vol. 24 No. 2, 1983, pp. 52-62.

15. Biggs, J. R., "Priority Rules...

...1, 1985, pp. 33-46.

16. Bertrand, J.W.M., "Balancing Production Level Variations and **Inventory** Variations",International Journal of Production Research, Vol. 24 No. 5, 1986, pp. 1059-74.

17...4, 1988, pp. 858-79.

29. McClelland, M.K. and Wagner, H.M., "Location of **Inventories** in an MRP Environment", Decision Sciences, Vol. 19 No. 3, 1988, pp. 535-53.

30...

...23 No. 1, 1985, pp. 167-83.
35. Weeks, J., Presentation to American Production and **Inventory** Control Society, Greensboro, NC, December 1987.

36. Marucheck, A.S. and McClelland, M.K., "A...

14/3,K/55 (Item 52 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00592857 92-08030
Determination of Optimal Intermediate Storage Capacity
Houshyar, Azim
Computers & Industrial Engineering v22n1 PP: 9-18 Jan 1992
ISSN: 0360-8352 JRNL CODE: CIE

...DESCRIPTORS: **Inventory** control

...ABSTRACT: demand rate and thus operates with periodic start-ups and shut-downs. Using analytical results, **total production** cost as a function of set-up costs, **safety stocks** , carrying costs, and storage costs is presented. The problem reduces to a nonlinear, dynamic, constrained...

...one for which a heuristic is developed that determines capacity of the buffers, the optimum **safety stocks** , cycle times for delivery of the raw material, and production runs such that overall costs...

14/3,K/56 (Item 53 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00572727 91-47078
Integrating Safety Stock and Lot-Sizing Policies for Multi-Stage Inventory **Systems Under Uncertainty**
Hsu, John I. S.; El-Najdawi, M. K.
Journal of Business Logistics v12n2 PP: 221-238 1991
ISSN: 0735-3766 JRNL CODE: JBL

Integrating Safety Stock and Lot-Sizing Policies for Multi-Stage Inventory **Systems Under Uncertainty**

DESCRIPTORS: **Inventory** management...

ABSTRACT: A planned **safety stock** is necessary when the demand for a product is uncertain. Traditionally, **safety stock** planning is done separately and is not integrated with lot-sizing policies. The **safety stock** level determined by one method may be more appropriately incorporated with a certain lot-sizing rule than other combinations. This **safety stock** lot-sizing relationship affects the number of setups, **inventories** carried, and frequency of shortages that determine the **total** cost of **production** . The effects of various integrated strategies on the performance of a 3-level product structure under uncertainty by simulation are examined. Four **safety stock** planning methods and 5 lot-sizing rules under 3 levels of forecasting error are examined...

14/3,K/57 (Item 54 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00406334 88-23167

Simulating the Economic Lot Scheduling Problem: Part II. Experimental Results
Galvin, Thomas M.
Production & Inventory Management v29n1 PP: 11-15 First Quarter 1988
ISSN: 0032-9843 JRNL CODE: PIM

DESCRIPTORS: **Inventory** management...

ABSTRACT: The **safety stock** requirements, customer service levels, and expected costs for the economic lot scheduling problem (ELSP) with...

...the ELSP eliminates conflicts in scheduling the facility. Customer service level is thought of as **total demand** quantity filled on time from stock divided by the **total demand** quantity. A simulation model is described in which all data pertain to an actual manufacturing...

...every cycle appears to impact favorably on service level. The ELSP seems to necessitate less **safety stock** than the ILS. ...

14/3,K/58 (Item 55 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00404930 88-21763
Plant Capacity as a Key to Inventory
Malina, Marshall A.
Chemical Engineering v95n8 PP: 139-142 May 23, 1988
ISSN: 0009-2460 JRNL CODE: CEG

Plant Capacity as a Key to Inventory

...DESCRIPTORS: **Inventory** control

ABSTRACT: Companies frequently build small plants that run continuously and carry a large **inventory** to meet peak demand rather than a large plant that can meet peak demand only...

...the better alternative, a model is presented that relates production capacity, capital cost, manufacturing cost, **inventory** cost, return on investment, **inventory** size, and demand pattern. The model is based on 5 variables: 1. capital cost of the facility, 2. **total** unit **manufacturing** cost, 3. incremental unit-manufacturing-cost of facilities of differing capacities, 4. the production facility's annual sales volume, and 5. the average-size **inventory** , excluding **safety stock** . Equations of net present value (NPV) are formulated for the demand schedules and production capacities...

14/3,K/59 (Item 56 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00359769 87-18603
Lot Sizes, Lead Times and In-Process Inventories
Karmarkar, Uday S.
Management Science v33n3 PP: 409-418 Mar 1987
ISSN: 0025-1909 JRNL CODE: MCI

Lot Sizes, Lead Times and In-Process Inventories

...DESCRIPTORS: **Inventory** management

ABSTRACT: In **manufacturing** problems, the **total** lead time taken to manufacture a product is an important consideration because long lead times can impose costs due to higher work-in-process **inventory** , increased uncertainty, larger **safety** **stocks** , and poorer performance to due dates. Although traditional lot-sizing models ignore lead time related...

...and lead times. These relationships and their implications for lot sizing and work-in-process **inventories** are examined. It is argued that the appropriate lot sizes are quite different from those...

14/3,K/60 (Item 57 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00300827 86-01241
An Integrated Decision System for Inventory **Management**
Kiran, Ali S.; Loewenthal, Alex
Computers & Industrial Engineering v9n4 PP: 379-386 1985
ISSN: 0360-8352 JRNL CODE: CIE

An Integrated Decision System for Inventory **Management**

DESCRIPTORS: **Inventory** management...

... **Inventory** control

ABSTRACT: Integrated Decision System for **Inventory** Management (IDSIM) is a microcomputer-based decision support system whose decision rules cover a wide...

...carrying and ordering costs are done in the first module. The 2nd one: 1. handles **aggregate** -level decisions for deterministic **demand** systems, 2. generates **total** cycle stock curves, and 3. addresses the problems of group replenishment and group discounts for deterministic systems. The 3rd module determines the optimum **safety** **stock** levels and optimum values of control parameters for order/point quantity as well as periodic...

...systems with normal and Laplace distributions. The 4th module deals with the allocation of total **safety** **stock** to minimize either the expected number of stockouts or the total value of shortages. ...

14/3,K/61 (Item 58 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00239221 84-17781
The 'Buffer Stock' Notion in Monetary Economics
Laidler, David
Economic Journal v94 (Supplement) PP: 17-34 1984
ISSN: 0013-0133 JRNL CODE: ECJ

ABSTRACT: Discussion of the '' **buffer** **stock** '' concept in monetary economics centers on its microeconomic background and the theoretical characteristics that differentiate...

...Austrian analysis and from the conventional Keynesian approach to monetary economics. The basis of the **buffer stock** idea can be found in its emphasis on trade being a matter of monetary exchange...

...quantity of money demanded as being a target or average-over-time value of an **inventory** . Although the neo-Austrian analysis of Robert E. Lucas, Jr., et. al. and the Keynesian...

...if the observed demand and supply for money were always equal to each other. The **buffer stock** notion challenges this aspect of both theories. The concept of price stickiness distinguishes the **buffer stock** notion from neo-Austrian analysis; the Keynesian approach and the **buffer stock** approach differ with regard to the existence of a short-run **aggregate demand** for money function. The **buffer stock** notion needs to be considered more seriously. ...

14/3,K/62 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

08973867 Supplier Number: 78019155 (USE FORMAT 7 FOR FULLTEXT)
JDA Software Acquires E3, World's Leading Provider of Inventory **Optimization Solutions; Acquisition Extends JDA's Reach up the Supply Chain with Integrated CPFR Software.**
Business Wire, p0101
Sept 10, 2001
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 2187

JDA Software Acquires E3, World's Leading Provider of Inventory **Optimization Solutions; Acquisition Extends JDA's Reach up the Supply Chain with Integrated CPFR Software.**
... Group, Inc. (Nasdaq:JDAS) announced today the acquisition of E3 Corporation, the global leader of **inventory** optimization systems.
Founded in 1980, privately held E3 has helped over 550 retailers, wholesalers, distributors and manufacturers in 20 countries to maximize their **inventory** decisions with computer assisted ordering and replenishment systems. With this acquisition, JDA has once again...

...such as E3, we have immediately gained the highest level of market share in the **inventory** replenishment space. Importantly, with approximately half of E3's clients being non-retail, we will...

...strongly supports our tier one growth strategy."
Affirming that E3 has set the standard for **inventory** replenishment, Peter Charness, JDA's senior vice president, marketing and chief product officer, said, "E3...

...Stadler. "With E3 serving as a cornerstone of our CPFR offering, we will provide the **total** solution that tightens **production** cycles, lowers **safety stock** requirements and reduces potential lost sales. When you combine Arthur Planning(TM), Intactix(TM) assortment...Armstrong's statement that we have gained the highest level of market share in the **inventory** replenishment space and the implication that we can maintain and leverage this market share; Mr...

...revenue goal; our ability to maintain and enhance E3's market-leading position in the **inventory** replenishment space, particularly since many of

E3's customers are wholesalers and distributors, who are...

14/3,K/63 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

08848867 Supplier Number: 76865013 (USE FORMAT 7 FOR FULLTEXT)
INSIGHT Squeezes Out New Capacity For Manufacturers - Announces Plant Line Scheduling Software ``PROFITS''.
Business Wire, p2233
July 31, 2001
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 607

... delivery from 95.6% to 99.8%. Clients find other benefits, such as reducing excess **inventory** by 50%, and reducing the time to produce an eight-week schedule by up to...

...ability to deliver orders on-time, optimize production changeovers, and lower in-process and finished **inventory** . PROFITS builds on INSIGHT's world-class proprietary optimization engine technology."
INSIGHT's PROFITS software...

...packaged goods industries from industrial lubricants to packaged food. It minimizes production costs, cuts excess **inventories** , recognizes efficiencies from longer production runs, selects production sequences to capitalize best on item-to...

...labor (i.e., regular, overtime, weekend, or holiday), item setup, item-to-item changeovers, shutdown, **inventory** , storage, etc. The user can set constraints or goals, such as **safety stock** , **total** ending **inventory** , and unmet **demand** . For each item produced, the model tracks beginning **inventory** , time-varying demand and production, and committed shipments and times.
A paper describing PROFITS has...

14/3,K/64 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

12139363 SUPPLIER NUMBER: 61202125 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Product family-based assembly sequence design methodology.(Statistical Data Included)
GUPTA, SAURABH; KRISHNAN, V.
IIE Transactions, 30, 10, 933
Oct, 1998
DOCUMENT TYPE: Statistical Data Included ISSN: 0740-817X
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 9869 LINE COUNT: 00839

... in its pickup truck division (2). Such proliferation of subassemblies leads to higher production and **inventory** carrying costs, and increased overhead burden and organizational confusion. Some of these costs (especially the **inventory** carrying costs) may be offset by resorting to an assemble-to-order approach; however, decreasing...different types of subassemblies. GSA's also lower customization costs by delaying the commitment of **inventory** to finished products. Note how assembly

sequence redesign (Fig. 2b) defers the point at which...

...step. This practice of delaying the differentiation of individual products can lead to savings in **inventory** investment when the product family experiences demand variability, and the products in the family are ...

...commonality among products (15,17). The benefits of component commonality in terms of reduced component **inventory** and improved service levels have been widely studied (18-21). Our work complements this research ...

...We show that by virtue of a proper assembly sequence, if a firm can keep **inventory** of common subassemblies, it will realize additional reduction in **safety stocks** and will improve its responsiveness to customer orders.

Redesigning the production and distribution processes to...present a simple model to show that subassemblies with maximum coverage reduce the amount of **safety stock** required to be responsive to customer needs.

3.2. Effect of coverage of generic subassembly on amount of **safety stock**

The situation we model is that of a company that offers a family of n ...

...before the order is delivered to the customer. In our model, the firm manages the **inventory** of the intermediate subassembly of product (P.sub.i) using a periodic review system, order...

...assembly sequence approach where each product is treated individually due to which separate intermediate subassembly **safety stock** is maintained for each of the products (see Fig. 3a). This **safety stock** is carried to protect against the situation in which the intermediate subassembly **inventory** is stocked out due to demand surges. The company uses the widely used approach of setting the **safety stock** of these subassemblies, (SS.sub.i), to be some multiple of the standard deviation of ...

...greater is (kappa)). Service level, which represents the proportion of demand that is satisfied from **inventory** , is a common substitute for stockout costs and is usually decided by the management of...be replenished, so the firm need not carry large amounts of the intermediate subassembly as **safety stock** .

Now suppose that by means of product family-based assembly sequence design the firm identifies...

...to use a periodic review system (order up to O(j) policy) to manage the **inventory** of the generic subassembly. Let d(j) represent the cumulated demand distributions of the products...
...shipping costs, etc.), but two important components we consider here are the cost of carrying **safety stock** , and the overhead costs incurred to monitor the different subassemblies. A large number of subassemblies...

...i.e., as j (coverage) increases, overhead costs decrease. We now consider the extent of **safety stock** savings.

The **safety stock** level of the generic subassembly, SS(j), is set in a fashion similar to the **safety stock** of the specific subassemblies, as a multiple of the standard deviation of the demand (but the **demand** considered is the **cumulative demand** of all the products the generic subassembly serves). Using the fact that the standard deviation...
productivity electronics company. The McKinsey Quarterly, 1, 21-28.

(11.) Lee, H.L. (1996) Effective **inventory** and service management through product and process redesign. Operations Research, 44(1), 151-159.
(12...

...Nuttle, H.L.W. (1986) The effect of commonality on safety stock in a simple **inventory** model. Management Science, 31, 982-988.
(20.) Fisher, M., Ramdas, K. and Ulrich, K. (1995...

...F-25030 Besanon, France.
(26.) Silver, E. A. and Peterson, R. (1985) Decision Systems For **Inventory** Management and Production Planning, 2nd edn, John Wiley & Sons, New York.
(27.) Chen, C.L...L. B. and Schrage, L. (1975) Optimal and system myopic policies for multi-echelon production/ **inventory** assembly systems. Management Science, 21(11), 1285-1294.
Computation time as a function of the...

14/3,K/65 (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

12138900 SUPPLIER NUMBER: 60964049 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The interaction of location and inventory **in designing distribution systems.**
ERLEBACHER, STEVEN J.; MELLER, RUSSELL D.
IIE Transactions, 32, 2, 155
Feb, 2000
ISSN: 0740-817X LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 9598 LINE COUNT: 00763

The interaction of location and inventory **in designing distribution systems.**
... decision is to maintain acceptable service while minimizing the fixed costs of operating the DCs, **inventory** holding costs at the DCs, and transportation costs between plants and DCs, and DCs and...

...hand, it is good to have few DCs since this reduces the cost of holding **inventory** via pooling effects, and reduces the fixed costs associated with operating DCs via economies of...

...opening additional distribution centers to lower transportation costs. However, if they open too many DCs, **inventory** costs will rise and offset any benefits in reduced transportation costs. Additional information on this...

...customers should be served by each DC? The problem represents a location-allocation problem where **inventory** costs are also considered (a location- **inventory** problem). In particular, we are interested in developing a strategic model for the location- **inventory** problem when there are a very large number of customers.

In the next section we review the related literature. Sections 3, 4 and 5 present the location- **inventory** problem model, our approach, and managerial insights from test problem results, respectively. A case-study ...

...of these types of research. The first stream of research addresses issues related to allocating **inventory** across multiple locations in a distribution system. For example, Eppen (3) shows the benefit of centralizing (or pooling) **inventory** in a multi-location newsvendor

problem. Eppen and Schrage (4) examine a system consisting of a central DC that holds no **inventory** but must allocate **inventory** to several retailers using a multi-period newsvendor framework. Schwarz (5) shows the benefit of pooling **inventory** in a multi-location EOQ framework. Since DC costs increase as the number of DCs...

...stylized analytical model (presented in Section 4.1.1). However, since he does not consider **inventory** issues, our model can be thought of as an extension to his work. (In fact, the results presented in Geoffrion (11) hold if we set the **inventory** cost factor equal to zero in our stylized model). The second is a paper by...factors over throughput, it is not easy to compare the two models.

3. The location- **inventory** problem

In this section we develop our model for the location- **inventory** problem. We present our assumptions, model parameters, decision variables, and a non-linear formulation.

3...

...locations and continuously-represented customer locations; and

(iv) each DC operates under a continuous-review **inventory** system;

(v) the location and capacity of each plant is known and fixed.

Figure 1...

...A, h, z,(sigma) = order cost, holding cost, safety-stock parameter, and standard deviation of **total** **demand** during lead-time, respectively.

Note that for the problem represented in Fig. 1, we have...9)

The four terms of the objective function, (1), are DC fixed costs, total DC **inventory** costs, and total transportation costs from plants to DCs, and from DCs to customers, respectively...

...found by determining the optimal DC location as discussed later (Section 4.3).

4. Location- **inventory** problem approach

In this section we present our approach to this problem. Since the problem...

...of demand to the N DCs. In the stylized model, the annual cost of holding **inventory** (cycle stock and safety stock) plus the annual ordering cost at ...objective function to the above optimization problem is the sum of a concave function (the **inventory** and ordering costs) and a convex function (the transportation costs). Since

f"((D.sub.i...

...on the optimal number of DCs; e.g., the transportation cost parameter, T, or the **inventory** cost parameter, I. Second, it allows us to examine how well the stylized model predicts...to determine LB(N) by calculating the lower bounds on the transportation costs and the **inventory**0 costs for a solution with N DCs.

4.3. Location-allocation heuristics

Given the difficulty of the location- **inventory** problem, we develop a heuristic procedure. A heuristic procedure must decide upon the number of ...one. For each pair of DCs, we compute a DC-savings value equal to the **inventory** savings minus the transportation cost increase associated with all of the customers for the two...

...of assigning the largest unassigned customer to each of the DCs by computing the new **inventory** costs (exactly) and the new transportation costs (which are estimated since we chose not to...

...perform a variety of computational studies as well as develop managerial insight into the location- **inventory** problem. We begin with a case-study

example based on our interaction with Frito-Lay...one test problem were close to being eliminated).

Like any complex optimization problem, these location- **inventory** problems are likely to have local optimum that may not be the global optimum. However...different DCs will serve these customers.

Conclusions and future research

This paper presents a location- **inventory** model for designing a two-level distribution system serving continuously represented customer locations. We develop...

...one may want to consider. For example, capacity limitations at the DCs, different types of **inventory** policies, and a multi-product environment all represent areas for future research with this type...of Business at Washington University. His research interests include optimization and analysis of production and **inventory** systems subject to variability. He received his M.S. and Ph.D. from The University...

...in a multi-warehouse system with lead times and random demand, in Multi-Level Production/ **Inventory** Systems: Theory and Practice, Schwarz, L.B. (ed), North-Holland, Amsterdam, pp. 51-67.

(5.) Schwarz, L.B. (1981) Physical distribution: the analysis of **inventory** and location. AIJE Transactions, 13, 138-150.

(6.) Meller, R.D. (1995) The impact of...

...174.

(14.) Erlebacher, S.J. and Meller, R.D. (1998) The interaction of location and **inventory** in distribution systems. Technical Report 98-02, Department of Industrial & Systems Engineering, Auburn University, 207...of N. Recall that there are three components to the total cost function (1): fixed, **inventory** , and transportation costs. Clearly, the fixed cost component of the bound is tight when fixed...

...the last two components, we relax two characteristics of the problem. First, we separate the **inventory** and transportation decisions. Second, we relax the actual customer locations. Given these relaxations to the...

...will not be tight in general.

With these two relaxations, a lower bound on the **inventory** costs will be achieved by the customer-to-DC assignment specified by the following lemma (see Erlebacher and Meller (14) for the proof).

Lemma 3. A lower-bound on the **inventory** costs are obtained by assigning the N - 1 lowest demand customer grids to the first...

14/3,K/66 (Item 3 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

11103785 SUPPLIER NUMBER: 54831014 (USE FORMAT 7 OR 9 FOR FULL TEXT)

The Chief Executive Guide to EBS.(includes related articles)(Enterprise Business Solutions)

Buxbaum, Peter; Ferrell, Keith; Haapaniemi, Peter; Oltman, Seth; Winkleman, Michael

Chief Executive (U.S.), 144, S3(2)
May, 1999
ISSN: 0160-4724 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 15967 LINE COUNT: 01269

... to coordinate and track manufacturing materiel, equipment, and labor. That connection gradually expanded, adding other **inventory** -related

elements.
Through the '70s and '80s, the major players in the integrated manufacturing and...its customer services group. "We wanted them to have access to financial information and to **inventory** levels by plant and warehouse," says Morgan. "This access was impossible with the mainframe. Like...of business processes and structures. Potential savings from automated data capture, lower transaction costs, higher **inventory** turns, and more efficient customer service can be quantified, Mirchandani says, and the success in...tool and an add-on to R/3. The focus will be on vendor-managed **inventory** and demand planning, says Morgan. "There is a big difference in the perception of this...procurement functions to leveraging the new "total view" of the supply chain to cut excessive **safety stocks** from **inventory** .
But the greatest value of an EBS will come over the long term - if CEOs...

14/3,K/67 (Item 4 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

10832177 SUPPLIER NUMBER: 53931926
Consolidating distribution centers can reduce lost sales.
Bordley, Robert; Beltramo, Mark; Blumenfeld, Dennis
International Journal of Production Economics, 58, 1, 57(5)
Jan 5, 1999
ISSN: 0925-5273 LANGUAGE: English RECORD TYPE: Abstract

...ABSTRACT: costs increase the probability of stockouts. Thus, consolidating distribution centers reduce the standard deviation for **aggregate demand** which, in turn, reduces lost sales.

DESCRIPTORS: **Inventory** control...
PRODUCT/INDUSTRY NAMES: 9915330 (**Inventory** Control)

14/3,K/68 (Item 5 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

08037880 SUPPLIER NUMBER: 17099741 (USE FORMAT 7 OR 9 FOR FULL TEXT)
On the implementation of a control-based forecasting system for aircraft spare parts procurement.
Foote, B.L.
IIE Transactions, v27, n2, p210(7)
April, 1995
ISSN: 0740-817X LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 5429 LINE COUNT: 00437

... Navy.
The system updated was designed basically in the late 1950s and called the Uniform **Inventory** Control System (UICP). It was an exponential smoothing forecasting system whose parameter Alpha| was changed...

...on their levels.
There is a deep and complex interaction of demand forecasting procedures with **inventory** system policies. The Navy used a (Q, r) policy (order Q if **inventory** on hand and on order is below r, do not order otherwise) implemented in the...

...were as high as seven billion dollars.
The fundamental interaction dilemma between a (Q, r) **inventory** system and an exponential smoothing forecasting system is that each month or quarter, as the...Hundreds of data sets were reviewed to find long-term trending data.
6. Forecasting for **inventory** replenishment models
If the purpose of the forecast is to supply data for **inventory** replenishment systems, consistency becomes more important, and being correct at a single point is not...

...are very important because buffer stock is a function of standard deviation. Note that leadtime **demand** is **cumulative** .
7. Statistical control tests of simple forecasting models
The level model D.sub.t| = Mu...prototype system that gave color data graphs of past demand when control tests were violated. **Inventory** managers could then review data sets, remove non-recurring demand, choose a set of data...

...be caused solely by the improvement in control system forecast. After 3 months the average **inventory** was down by 55%, oversupply by 38% and obsolete **inventory** by 54%. Later results showed a 20% further oversupply reduction and a 15% further reduction...
...to challenge demand estimates by managers.
These new policies were a strong factor in boosting **inventory** effectiveness. Lowered defense funding and drops in commercial demand have had a big impact on...

...DESCRIPTORS: **Inventory** control

14/3,K/69 (Item 6 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

07601032 SUPPLIER NUMBER: 16298153 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Retail gets link to factories: manufacturing ISV, Nielsen team on product forecasting. (Manugistics and Nielsen North America to offer point-of-sale systems with manufacturing applications)
Bowen, Ted Smalley
PC Week, v11, n48, p45(2)
Dec 5, 1994
ISSN: 0740-1604 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 384 LINE COUNT: 00033

... planning, manufacturing, distribution, and sales.
"This capability is going to allow us to reduce our **inventory** and improve overall customer service. It will allow us to take down our safety stock...

...s not, in terms of marketing programs. The key is that, instead of forecasts of **aggregate** **demand** , we will be able to track actual repleni shment data by account."
The vendors will...

14/3,K/70 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

06817335 SUPPLIER NUMBER: 14861153 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Taking Money Seriously and Other Essays. (book reviews)
Siegel, Barry N.
Atlantic Economic Journal, v21, n3, p60A(12)
Sept, 1993
DOCUMENT TYPE: review ISSN: 0197-4254 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 7091 LINE COUNT: 00562

... costs.
Laidler admits that lines of credit, stocks of other liquid assets, and even some **inventories** of goods also act as buffers. But these alternative assets hardly preclude the use of...

...put in their hours and suppliers get their money after making deliveries. Firms produce for **inventory** , hoping that sales will materialize. Information on market clearing prices is costly and, without the...

...in which prices are set endogenously, market signals take the form of variations of goods **inventories** and of complementary inflows and outflows of money into or out of holdings of money...turn, use the money to buy goods and securities. Because prices are sticky, the increased **aggregate demand** stimulates **production** and employment. Eventually, the build-up of pressures on product and factor markets leads sellers...In discussing the aggregative significance of the buffer-stock approach, Milbourne [1987] manipulates the stochastic **inventory** -theoretic model of Miller and Orr [1966] to show that changes in money supply are...

...the aggregate level. Contrary to Milbourne, the economy's money stock is frequently "off" the **aggregate demand** curve for money.
Laidler discusses the crucial assumption of the exogeneity of money in TMS...

14/3,K/71 (Item 8 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

04133394 SUPPLIER NUMBER: 07783102 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Solectron's Chen crusades for U.S. manufacturing excellence. (Winston Chen) (Quest for Quality) (company profile)
Haavind, Robert
Electronic Business, v15, n20, p72(3)
Oct 16, 1989
DOCUMENT TYPE: company profile ISSN: 0163-6197 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 2493 LINE COUNT: 00199

... to the next workstation or machine by request rather than pushing work along and maintaining **buffer stocks** ; continuous flow manufacturing; and the use of "fishbone" charts that display potential upstream causes of...

...gurus such as Taiichi Ohno, a Toyota vice president who helped the company achieve annual **inventory** turnover of some 90 times, versus the 3.5 times common in U.S. plants...

...through dramatic reductions in cycle times (particularly machine set-up times), by drastic cuts in **inventories** , and by greatly reducing lot sizes. Cycle-time reduction and just-in-time manufacturing forces...the

assembly of a complex mainframe disk drive with more than 2,000 components -- the **inventory** needed was cut from $18 million to $3.5 million, cycle time was reduced from...

14/3,K/72 (Item 1 from file: 160)
DIALOG(R)File 160:Gale Group PROMT(R)

01656371
Zemex - Market Information.
ANNUAL REPORT 1986 p. 02

... a relatively stable price and a balance between supply and demand. The agreements incorporated a **buffer stock** , designed to provide adequate supplies for consumers while maintaining metal prices within predetermined ranges by...

... member countries; thus the producer members of the ITC represented a substantially decreased share of **total** world **production** . As a result, the export controls imposed during the nearly four years prior to the...

... of the ITC only very slowly reduced the excess of supply over demand. The ITC **Buffer Stock** Manager was successful in maintaining the selling price of tin but available funds were depleted under the burden of managing a large **inventory** of tin metalP Following the October 1985 cessation of tin trading, representatives of the member...

14/3,K/73 (Item 2 from file: 160)
DIALOG(R)File 160:Gale Group PROMT(R)

01632107
Indian fertilizer glut.
EUROPEAN CHEMICAL NEWS May 4, 1987 p. 16

India: Fertilizer **production** will **total** 6.9mil tons in 1987, vs 5.8mil tons in 1985-86 and 5.2mil...

...2 million tons in 1984-85 and 8.7 million tons in 1985-86. Fertilizer **inventories** totaled 3.5 million tons as of beginning-4/87, vs the usual **buffer stock** requirement of 1.5 million tons. ...

14/3,K/74 (Item 1 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter

10780113 (USE FORMAT 7 OR 9 FOR FULLTEXT)
Rio Tinto - Quarterly Production Rpt-Pt 2
REGULATORY NEWS SERVICE
April 28, 2000
JOURNAL CODE: WRNS LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 4434

(USE FORMAT 7 OR 9 FOR FULLTEXT)

... quarter of 1999, was lower principally due to timing of the treatment of in-process **inventories** . Barneys Canyon Mine Ore treated

('000 tonnes) 490 623 676 542 461 2,331 Average...consistently producing at a rate higher than design capacity. Oxide ore crushed was reduced as **buffer stocks** of crushed ore on the pads exceeded leach requirements. Somincor **Total production** at the Neves Corvo mine (Rio Tinto 49%) in Portugal. (100% basis) Neves Corvo Mine...

... with a change in mine plan. Nickel sulphate production was boosted by the high electrolyte **inventory** level carried over from December 1999. Vermiculite production was adversely affected by the excessive rain...

14/3,K/75 (Item 2 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter

08919125 (USE FORMAT 7 OR 9 FOR FULLTEXT)
Cotton crises or blessing
DR AYUB MEHAR
BUSINESS RECORDER
December 30, 1999
JOURNAL CODE: WBRE LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 2991

(USE FORMAT 7 OR 9 FOR FULLTEXT)

... the situation has arisen as a result of a temporary expansion in the world cotton **inventories** . The expected carry over stocks were estimated 41 million bales (as compared to 44 million bales in present **inventories**).
... total import of cotton within the two years is less than 10 percent of the **total demand** for cotton at workable capacity in Pakistan. It should be remembered that import of long...near future when prices will be stabilised. However Pasco should play a role of buffer **inventory** holder and not an exporter.

If government ignore the market price of cotton and buy...Consumption
88.5 84.9 87.2

Export	26.6	23.3	25.2
Ending **Inventories**	40.8	41.6	41.1

==
Source: United States Department of Agriculture
==
=================
Duration of
ginning...

14/3,K/76 (Item 1 from file: 610)
DIALOG(R)File 610:Business Wire

00564297 20010731212B5042 (USE FORMAT 7 FOR FULLTEXT)
INSIGHT Squeezes Out New Capacity For Manufacturers - Announces Plant Line Scheduling Software ``PROFITS''-New Multi-Period, Multi-Product Model Attains True Optima Never Previously Possible
Business Wire
Tuesday, July 31, 2001 08:31 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 554

TEXT:
...delivery from
95.6% to 99.8%. Clients find other benefits, such as reducing excess
inventory
by 50%, and reducing the time to produce an eight-week schedule by up to...

...ability to deliver orders
on-time, optimize production changeovers, and lower in-process and finished
inventory . PROFITS builds on INSIGHT's world-class proprietary
optimization
engine technology."
...packaged goods industries
from industrial lubricants to packaged food. It minimizes production costs,
cuts excess **inventories** , recognizes efficiencies from longer production
runs,
selects production sequences to capitalize best on item-to...

...labor (i.e., regular, overtime, weekend, or holiday), item
setup, item-to-item changeovers, shutdown, **inventory** , storage, etc. The
user
can set constraints or goals, such as **safety** **stock** , **total** ending
inventory ,
and unmet **demand** . For each item produced, the model tracks beginning
inventory , time-varying demand and production, and committed shipments
and
times.

A paper describing PROFITS has...

...INDUSTRY NAMES: **INVENTORY**
?

```
Set     Items   Description
S1        960   (SAFETY OR BUFFER)(2N)STOCK? ?
S2      75442   INVENTORY OR INVENTORIES
S3     239491   DEMAND
S4    1929966   SUPPLY OR SUPPLIES OR PRODUCE OR PRODUCTION OR MANUFACTUR?
S5     847880   CUMULATIVE OR AGGREGAT? OR TOTAL?
S6    1494474   VALUE? ? OR QUANTITY OR QUATITIES OR AMOUNT
S7    2599793   TIME OR PERIOD? OR DURATION? ?
S8        381   S1 AND S2
S9        194   S8 AND S3
S10        51   S9 AND S5
S11        40   S10 NOT PY>2000
S12        40   RD (unique items)
? show file
File   2:INSPEC 1969-2005/Aug W3
         (c) 2005 Institution of Electrical Engineers
File  35:Dissertation Abs Online 1861-2005/Aug
         (c) 2005 ProQuest Info&Learning
File  65:Inside Conferences 1993-2005/Aug W4
         (c) 2005 BLDSC all rts. reserv.
File  99:Wilson Appl. Sci & Tech Abs 1983-2005/Jul
         (c) 2005 The HW Wilson Co.
File 474:New York Times Abs 1969-2005/Aug 31
         (c) 2005 The New York Times
File 475:Wall Street Journal Abs 1973-2005/Aug 31
         (c) 2005 The New York Times
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
File 256:TecInfoSource 82-2005/Aug
         (c) 2005 Info.Sources Inc
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Considered /JF 2/16/09

12/5/1 **(Item 1 from file: 2)**
DIALOG(R)File 2:INSPEC

6738332 INSPEC Abstract Number: C2000-12-1290F-007
Title: Requirements planning with substitutions: exploiting bill-of-materials flexibility in production planning
Author(s): Balakrishnan, A.; Geunes, J.
Author Affiliation: Smeal Coll. of Bus. Adm., Pennsylvania State Univ., University Park, PA, USA
Journal: Manufacturing & Service Operations Management vol.2, no.2 p.166-85
Publisher: INFORMS,
Publication Date: 2000 Country of Publication: USA
CODEN: MSOMFV ISSN: 1523-4614
SICI: 1523-4614(2000)2:2L.166:RPWS;1-5
Material Identity Number: H428-2000-002
U.S. Copyright Clearance Center Code: 1523-4614/2000/0202/0166$05.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Designing product lines with substitutable components and subassemblies permits companies to offer a broader variety of products while continuing to exploit economies of scale in production and **inventory** costs. Past research on models incorporating component substitutions focuses on the benefits from reduced **safety - stock** requirements. The paper addresses a dynamic requirements-planning problem for two-stage multiproduct manufacturing systems with bill-of-materials flexibility, i.e., with options to use substitute components or subassemblies produced by an upstream stage to meet **demand** in each period at the downstream stage. We model the problem as an integer program, and describe a dynamic-programming solution method to find the production and substitution quantities that satisfy given multiperiod downstream demands at minimum **total** setup, production, conversion, and holding cost. This methodology can serve as a module in requirements-planning systems to plan opportunistic component substitutions based on relative future demands and production costs. Computational results using real data from an aluminum-tube manufacturer show that substitution can save, on average, 8.7% of manufacturing cost. We also apply the model to random problems with a simple product structure to develop insights regarding substitution behavior and impacts. (29 Refs)
Subfile: C
Descriptors: graph theory; integer programming; production control; stock control
Identifiers: requirements planning; bill-of-materials flexibility; production planning; product lines; substitutable components; subassemblies ; economies of scale; **inventory** costs; production costs; component substitutions; **safety - stock** requirements; two-stage multiproduct manufacturing systems; aluminum-tube manufacturer
Class Codes: C1290F (Systems theory applications in industry); C1160 (Combinatorial mathematics); C1180 (Optimisation techniques)

12/5/2 **(Item 2 from file: 2)**
DIALOG(R)File 2:INSPEC

5813343 INSPEC Abstract Number: C9803-1290F-017
Title: Analysis of a production/ inventory **system subject to random disruptions**

Author(s): Moinzadeh, K.; Aggarwal, P.
Author Affiliation: Dept. of Mange. Sci., Washington Univ., Seattle, WA, USA
Journal: Management Science vol.43, no.11 p.1577-88
Publisher: Inst. Oper. Res. & Manage. Sci,
Publication Date: Nov. 1997 Country of Publication: USA
CODEN: MSCIAM ISSN: 0025-1909
SICI: 0025-1909(199711)43:11L.1577:APIS;1-T
Material Identity Number: M120-97013
U.S. Copyright Clearance Center Code: 0025-1909/97/4311/1577$05.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)

Abstract: In this paper we study an unreliable bottleneck production/ **inventory** system with a constant production and **demand** rate that is subject to random disruptions. We assume that the restoration times are constant, the time between breakdowns is exponential, the production setup cost and/or setup time is positive, and excess **demand** is backordered. We propose an (s, S) production policy for such systems and develop expressions for the operating characteristics of the system. The properties of the policy parameters that minimize the expected **total** cost rate are investigated and a procedure for finding their optimal values is developed. In addition, we devise and test a simple heuristic procedure for finding near optimal production policies. The results of a numerical experiment suggest that: (i) setup cost reduction is more effective in reducing **total** operating cost when the production system is more reliable, (ii) setup cost reduction in unreliable production systems results in higher optimal **safety stock** level, and (iii) proper determination of the **safety stock** levels is extremely important in just-in-time systems, which are susceptible to disruptions. (24 Refs)

Subfile: C
Descriptors: heuristic programming; minimisation; production control; random processes; reliability theory; stock control
Identifiers: unreliable bottleneck production/ **inventory** system; random disruptions; constant production rate; constant **demand** rate; constant restoration times; JIT; setup time; (s, S) production policy; expected **total** cost rate minimization; heuristic; setup cost reduction; **total** operating cost; optimal **safety stock** level; just-in-time systems
Class Codes: C1290F (Systems theory applications in industry); C1210B (Reliability theory); C1140Z (Other topics in statistics); C1180 (Optimisation techniques); C1230 (Artificial intelligence)

12/5/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

5714478 INSPEC Abstract Number: C9711-1290Z-008
Title: Planning of fuel coal imports using a mixed integer programming method
Author(s): Li-Hsing Shih
Author Affiliation: Dept. of Miner. & Pet. Eng., Cheng Kung Univ., Tainan, Taiwan
Journal: International Journal of Production Economics vol.51, no.3 p.243-9
Publisher: Elsevier,
Publication Date: 15 Sept. 1997 Country of Publication: Netherlands
CODEN: IJPEE6 ISSN: 0925-5273
SICI: 0925-5273(19970915)51:3L.243:PFCI;1-S
Material Identity Number: P531-97011

U.S. Copyright Clearance Center Code: 0925-5273/97/$17.00
Document Number: S0925-5273(97)00078-9
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: In the public utility and commercial fuel industries, commodities from multiple supply sources are sometimes blended before use to reduce costs and assure quality. A typical example of these commodities is the fuel coal used in coal fired power plants. The diversity of the supply sources for these plants makes the planning and scheduling of fuel coal logistics difficult, especially for a power company that has more than one power plant. This study proposes a mixed integer programming model that provides planning and scheduling of coal imports from multiple suppliers for the Taiwan Power Company. The objective is to minimize **total inventory** cost by minimizing procurement cost, transportation cost and holding cost. Constraints on the system include company procurement policy, power plant **demand** , harbor unloading capacity, **inventory** balance equations, blending requirement, and **safety stock** . An example problem is presented using the central coal logistics system of the Taiwan Power Company to demonstrate the validity of the proposed model. (18 Refs)
Subfile: C
Descriptors: coal; goods distribution; integer programming; power plants; stock control
Identifiers: fuel coal imports; mixed integer programming method; public utility; commercial fuel industries; coal fired power plants; logistics; Taiwan Power Company; **total inventory** cost; procurement cost; transportation cost; holding cost; procurement policy; power plant **demand** ; harbor unloading capacity; **inventory** balance equations; blending requirement; **safety stock** ; central coal logistics system
Class Codes: C1290Z (Other applications of systems theory); C1180 (Optimisation techniques); C1290H (Systems theory applications in transportation)

12/5/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

5494401 INSPEC Abstract Number: C9703-1290F-117
Title: Buffer stock **under the effect of fluctuating** demand
Author(s): Salameh, M.K.
Author Affiliation: Fac. of Eng. & Archit., American Univ. of Beirut, Lebanon
Journal: Production Planning and Control vol.8, no.1 p.37-40
Publisher: Taylor & Francis,
Publication Date: Jan.-Feb. 1997 Country of Publication: UK
CODEN: PPCOEM ISSN: 0953-7287
SICI: 0953-7287(199701/02)8:1L.37:BSUE;1-T
Material Identity Number: 0556-97001
U.S. Copyright Clearance Center Code: 0953-7287/97/$12.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: This paper deals with an **inventory** situation where the rate of **demand** for units stocked is known, but fluctuating over time. The focus of attention is on reserve stock. In an ideal world, where **demand** is known well in advance and where suppliers maintain scheduled shipping dates, there would be little need to hold any form of **inventory** other than a limited in-process stock. In practice, however, supply interruptions are likely to occur. In this case an **inventory** acts as buffer to withstand variations between supply and **demand** . A mathematical model to

determine the optimum reserve stock needed to minimize the expected **total** **inventory** cost of carrying the reserve **inventory** and cost of stockouts is developed. (10 Refs)
Subfile: C
Descriptors: costing; optimisation; production control; stock control
Identifiers: **buffer** **stock** ; fluctuating **demand** ; stock control; shipping dates; in-process stock; mathematical model; reserve stock; **inventory** cost; stockout time; supply time; supply interruption
Class Codes: C1290F (Systems theory applications in industry); C1290D (Systems theory applications in economics and business); C1180 (Optimisation techniques)

12/5/5 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

5390229 INSPEC Abstract Number: C9611-1290F-091
Title: A production ordering system for two-item, two-stage, capacity-constraint production and inventory **model**
Author(s): Ishii, K.; Imori, S.
Author Affiliation: Dept. of Ind. Eng., Kanazawa Inst. of Technol., Ishikawa, Japan
Journal: International Journal of Production Economics vol.44, no.1-2 p.119-28
Publisher: Elsevier,
Publication Date: 15 June 1996 Country of Publication: Netherlands
CODEN: IJPEE6 ISSN: 0925-5273
SICI: 0925-5273(19960615)44:1/2L.119:POSI;1-B
Material Identity Number: P531-96007
U.S. Copyright Clearance Center Code: 0925-5273/96/$15.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: This paper proposes an effective production ordering system for two-item, two-stage, capacity-constraint production and **inventory** systems, which reduces the fluctuations in **total** work load and **inventory** levels. The model system developed manufactures two final products whose component parts are a standard one and one with optional specifications chosen by the customer. As a result, simulation shows the influences of the **safety** **stock** of the optional component parts, average **total** work load ratio, and coefficient of variation of **demand** upon standard deviations of **total** work load and **inventory** levels in each stage. (11 Refs)
Subfile: C
Descriptors: production control; stock control
Identifiers: production ordering system; two-item two-stage capacity-constraint production and **inventory** model; **inventory** levels; final products; **safety** **stock** ; average **total** work load ratio
Class Codes: C1290F (Systems theory applications in industry)

12/5/6 (Item 6 from file: 2)
DIALOG(R)File 2:INSPEC

5390228 INSPEC Abstract Number: C9611-1290F-090
Title: Comparative analysis of ordering models for an international co-operative global complementary production system

Author(s): Hiraki, S.
Author Affiliation: Fac. of Econ., Hiroshima Univ., Japan
Journal: International Journal of Production Economics vol.44, no.1-2 p.105-17
Publisher: Elsevier,
Publication Date: 15 June 1996 Country of Publication: Netherlands
CODEN: IJPEE6 ISSN: 0925-5273
SICI: 0925-5273(19960615)44:1/2L.105:CAOM;1-B
Material Identity Number: P531-96007
U.S. Copyright Clearance Center Code: 0925-5273/96/$15.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)

Abstract: In recent years, international co-operative global complementary production systems (ICGCPS), especially in the automobile industry, have been widely developed in order to improve the international coordination and division of labor in the developing countries. ICGCPS is a global production system with several production bases located in several countries. In order to get the advantages of scale, each production base produces only special kinds of components and machining parts for the **total demand** required in all the participating countries, and supplies them to the other production bases. This paper aims to design a production, **inventory** and transportation system to realize high productivity and low **inventory** in the ICGCPS for the mutual development of all the countries. We propose two types of ordering models based on the concept of the pull-type ordering system in the form of a mathematical model. One is a product-oriented ordering model and the other is a component-oriented ordering model. We make a comparative analysis of these two ordering models with respect to the distribution properties of ordering, withdrawal and **inventory** quantities at each stage and stock point for determining adequate **buffer stock** in the system. (7 Refs)

Subfile: C
Descriptors: goods distribution; production control; statistical analysis ; stock control
Identifiers: comparative analysis; ordering models; international co-operative global complementary production system; international coordination; division of labor; developing countries; transportation system; **inventory** system; production system; high productivity; low **inventory** ; pull-type ordering system; product-oriented ordering model; component-oriented ordering model; distribution properties; adequate **buffer stock**
Class Codes: C1290F (Systems theory applications in industry); C1290H (Systems theory applications in transportation); C1140Z (Other topics in statistics)
Copyright 1996, IEE

12/5/7 (Item 7 from file: 2)
DIALOG(R)File 2:INSPEC
(c) 2005 Institution of Electrical Engineers. All rts. reserv.

4871830 INSPEC Abstract Number: C9503-1290F-040
Title: Period batch control in group technology
Author(s): Kaku, B.K.; Krajewski, L.J.
Author Affiliation: Coll. of Bus. & Manage., Maryland Univ., College Park, MD, USA
Journal: International Journal of Production Research vol.33, no.1 p.79-99
Publication Date: Jan. 1995 Country of Publication: UK
CODEN: IJPRB8 ISSN: 0020-7543
U.S. Copyright Clearance Center Code: 0020-7543/95/$10.00

Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Group technology (GT) offers many advantages to firms engaged in batch manufacturing, including lower setup times, reduced lot sizes, lower lead times, and easier production planning and control. Period batch control (PBC) has been proposed in the literature as a simple production planning and control system for a GT environment, based on the choice of a cycle length. Unfortunately, there are no published studies providing guidelines for the choice of an optimal cycle length. In this paper we develop a cost minimization model for examining the choice of cycle length, and demonstrate its use by applying it to four published data sets. The analysis shows that the cell design itself directly affects **total inventory** and overtime costs and the choice of cycle length; that **demand** increases can be very expensive for a given cell design; and that the degree of **demand** uncertainty is an important factor in PBC design. The key managerial consideration is the amount of slack capacity to build into the cell designs to handle **demand** uncertainty. Finally, we studied the effect of **safety stocks** on costs and cycle lengths. Results indicate that **safety stocks** can reduce both **total** cost and cycle length. (28 Refs)
Subfile: C
Descriptors: batch processing (industrial); manufacture; minimisation; production control
Identifiers: period batch control; group technology; GT; batch manufacturing; setup times; lot sizes; lead times; production planning; production control; cycle length; cost minimization model; **inventory** costs; overtime costs; **demand** uncertainty
Class Codes: C1290F (Systems theory applications in industry); C1180 (Optimisation techniques)

12/5/8 (Item 8 from file: 2)
DIALOG(R)File 2:INSPEC

04182146 INSPEC Abstract Number: C9208-1290F-044
Title: Emergency inventory **ordering assuming Poisson demands**
Author(s): White, C.R.; White, B.R.
Author Affiliation: Auburn Univ., AL, USA
Journal: Production Planning and Control vol.3, no.2 p.168-74
Publication Date: April-June 1992 Country of Publication: UK
CODEN: PPCOEM ISSN: 0953-7287
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Most business and industrial firms use some procedure for emergency ordering. If independent **demand** for low-volume, high-cost items is Poisson distributed, subsequent analysis reveal that emergency ordering may be less expensive than carrying extra **safety stock** . Emergency ordering reduces the out-of-stock cost as well as the required **safety stock** . **Total** cost is sensitive to the lead time required for emergency orders. The results are particularly applicable to maintenance **inventory** . Under the assumptions of this study, the conclusion may be drawn that an emergency ordering system may approach the theoretical minimum for operating an **inventory** system. (11 Refs)
Subfile: C
Descriptors: management; production control; stock control
Identifiers: production control; stock control; management; stockout costs; **inventory** ; Poisson demands; emergency ordering; lead time
Class Codes: C1290F (Industry)

12/5/9 (Item 9 from file: 2)
DIALOG(R)File 2:INSPEC

03794698 INSPEC Abstract Number: C91008122
Title: Safety stock **reduction by order splitting**
Author(s): Kelle, P.; Silver, E.A.
Author Affiliation: Dept. of Quantitative Bus. Anal., Louisiana State Univ., Baton Rouge, LA, USA
Journal: Naval Research Logistics vol.37, no.5 p.725-43
Publication Date: Oct. 1990 Country of Publication: USA
CODEN: NRLOEP ISSN: 0028-1441
U.S. Copyright Clearance Center Code: 0028-1441/90/050725-19$04.00
Language: English Document Type: Journal Paper (JP)
Treatment: General, Review (G)
Abstract: The authors consider an item for which a continuous review, reorder point, order quantity **inventory** control system is used. The amount of **safety stock** required depends upon, among other factors, the average value and variability of the length of the replenishment lead time. One way to reduce these quantities is to split orders among two or more vendors. In this article the random lead times are assumed to have Weibull distributions. This permits the development of analytic expressions for the reduction in the expected value and variability of **total demand** until the critical first (earliest) delivery received from a vendor. An expression is also obtained for the reorder point that provides a given probability of no stockout prior to the first delivery. Lower bounds are given on the order quantity so as to ensure that the probability of a stockout before any one of the later (second, third, etc.) deliveries is sufficiently small to be considered negligible. The analytic and tabular results can be used to estimate the benefits (reduced carrying costs and/or increased service level) of order splitting. (19 Refs)
Subfile: C
Descriptors: stock control
Identifiers: lower bounds; order splitting; continuous review; reorder point; order quantity **inventory** control system; random lead times; Weibull distributions; order splitting
Class Codes: C1290F (Industry)

12/5/10 (Item 10 from file: 2)
DIALOG(R)File 2:INSPEC

03510522 INSPEC Abstract Number: C90000684
Title: A model for use in the rationing of inventory **during lead time**
Author(s): Haynsworth, H.C.; Price, B.A.
Author Affiliation: Winthrop Coll., Rock Hill, SC, USA
Journal: Naval Research Logistics vol.36, no.4 p.491-506
Publication Date: Aug. 1989 Country of Publication: USA
CODEN: NRLOEP ISSN: 0028-1441
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: While the traditional solution to the problem of meeting stochastically variable demands for **inventory** during procurement lead time is through the use of some level of **safety stock** , several authors have suggested that a decision be made to employ some form of rationing so as to protect certain classes of demands against stockout by restricting issues to other classes. Nahmias and Demmy (1981) derived an approximate

continuous review model of systems with two **demand** classes which would permit an **inventory** manager to calculate the expected fill rates per order cycle for high-priority, low-priority, and **total** system demands for a variety of parameters. The manager would then choose the rationing policy that most closely approximated his fill-rate objectives. This article describes a periodic review model that permits the manager to establish a discrete time rationing policy during lead time by prescribing a desired service level for high-priority demands. Simulation tests of the model indicate they are more effective than the single reserve level policy studied by Nahmias and Demmy. (15 Refs)

Subfile: C

Descriptors: probability; stochastic processes; stock control

Identifiers: stock control; stochastic processes; **inventory** rationing; procurement lead time; **safety stock** ; approximate continuous review model; **inventory** manager; expected fill rates; periodic review model; discrete time rationing policy

Class Codes: C1290F (Industry); C1140Z (Other and miscellaneous)

12/5/11 (Item 11 from file: 2)

DIALOG(R)File 2:INSPEC

03441665 INSPEC Abstract Number: C89053283

Title: A practical near-optimal order quantity method

Author(s): Mabin, V.J.

Author Affiliation: Sci. & Ind. Res. Inst., Wellington, New Zealand

Journal: Engineering Costs and Production Economics vol.15 p.381-6

Publication Date: May 1989 Country of Publication: Netherlands

CODEN: ECPEDE ISSN: 0167-188X

U.S. Copyright Clearance Center Code: 0167-188X/88/$03.50

Conference Title: Fourth International Symposium on Inventories

Conference Date: 25-29 Aug. 1986 Conference Location: Budapest, Hungary

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: The paper attempts to find simple near-optimal formulae for the order quantity and **safety stocks** , which can be used by **inventory** controllers. It presents a method of deriving a closed form solution of the **total** cost function. This gives a simple formula for Q, which can be calculated directly. It replaces the need to compute an EOQ or use ad hoc procedures. The formula is simple enough to be calculated on a hand-calculator. It appeals to **inventory** controllers and management because they can obtain an order quantity (or order cycle) and reorder level directly. The approach can be applied to service definitions, lead time **demand** distributions and **inventory** systems other than those assumed in the paper. (9 Refs)

Subfile: C

Descriptors: operations research; optimisation; stock control

Identifiers: stock control; operations research; optimisation; near-optimal order quantity method; **inventory** ; **total** cost function; order cycle; reorder level; service definitions; lead time **demand** distributions

Class Codes: C1290F (Industry); C1180 (Optimisation techniques)

12/5/12 (Item 12 from file: 2)

DIALOG(R)File 2:INSPEC

02910692 INSPEC Abstract Number: C87038138
Title: A graphical method for optimizing a continuous review inventory **system**
Author(s): Horowitz, A.D.; Daganzo, C.F.
Author Affiliation: Gen. Motors Res. Lab., Warren, MI, USA
Journal: Production and Inventory Management vol.27, no.4 p.30-45
Publication Date: 1986 Country of Publication: USA
CODEN: PIMGAT ISSN: 0032-9843
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Blumenfeld et al. (1985) developed an analytic model to evaluate trade-offs between transportation and **inventory** costs of parts when supply and **demand** are uncertain. This article extends the Blumenfeld study by developing a graphical method to estimate: (1) the impact of uncertainty reduction upon **total inventory** and transportation cost; and (2) optimal shipment size and optimal **safety stock** for a given level of uncertainty. In this way, it becomes possible to gauge the consequences of forecasting improvements as well as that of other uncertainty reduction actions. (3 Refs)
Subfile: C
Descriptors: production control; stock control
Identifiers: stock control; graphical method; continuous review **inventory** system; **inventory** costs; uncertainty; transportation cost; optimal shipment size; optimal **safety stock**
Class Codes: C1290F (Industry)

12/5/13 (Item 13 from file: 2)
DIALOG(R)File 2:INSPEC

02746827 INSPEC Abstract Number: C86050622
Title: Simulated safety stock **allocation in a two-echelon distribution system**
Author(s): Chakravarty, A.K.; Shtub, A.
Author Affiliation: Sch. of Bus. Adm., Wisconsin Univ., Milwaukee, WI, USA
Journal: International Journal of Production Research vol.24, no.5 p.1245-53
Publication Date: Sept.-Oct. 1986 Country of Publication: UK
CODEN: IJPRB8 ISSN: 0020-7543
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Deals with two important decisions in a two-echelon **inventory** system operating under stochastic **demand** and stochastic leadtime. The first of these decisions is the **aggregate** level of **safety stock** carried in the system. The second decision is the allocation of the **total safety stock** within the system. A simulation is performed to study the sensitivity of the system to both decisions. Based on the study, guidelines for efficient management of **safety stocks** in a two-echelon **inventory** system are suggested. (16 Refs)
Subfile: C
Descriptors: management; stock control
Identifiers: stock control; **safety stock** allocation; two-echelon distribution system; two-echelon **inventory** system; stochastic **demand** ; stochastic leadtime; management
Class Codes: C1290F (Industry)

12/5/14 (Item 14 from file: 2)
DIALOG(R)File 2:INSPEC

02618921 INSPEC Abstract Number: C86019727
Title: An integrated decision system for inventory **management**
Author(s): Kiran, A.S.; Loewenthal, A.
Author Affiliation: Dept. of Ind. & Syst. Eng., Univ. of Southern California, Los Angeles, CA, USA
Journal: Computers & Industrial Engineering vol.9, no.4 p.379-86
Publication Date: 1985 Country of Publication: UK
CODEN: CINDDL ISSN: 0360-8352
U.S. Copyright Clearance Center Code: 0360-8352/85$3.00+.00
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Decision rules for **inventory** control parameters are combined in a microcomputer based information and decision system. Decision rules implemented in IDSIM cover a wide variety of models for deterministic and stochastic **demand** cases. The system consists of four modules: the determination of economic order and production quantities and the evaluation of any arbitrary ordering rule in terms of carrying and ordering costs are accomplished in the first module. The second module deals with **aggregate** level decisions for deterministic **demand** systems, generates **total** cycle stock curves, and addresses the problems of group replenishment and group discounts for deterministic systems. The third module calculates the optimum **safety stock** levels and optimum values of control parameters for order/point quantity as well as periodic review/order-up-to-level parameters in stochastic systems with normal and Laplace distributions. Other sophisticated algorithms, which utilize interactive procedures and yield near optimal solutions, are incorporated in the fourth module for the allocation of **total safety stock** to minimize either the expected number of stockouts or the **total** value of shortages. (6 Refs)
Subfile: C
Descriptors: decision support systems; stock control data processing
Identifiers: integrated decision system; **inventory** management; **inventory** control parameters; IDSIM; economic order; production quantities ; deterministic **demand** systems; **total** cycle stock curves
Class Codes: C7102 (Decision support systems); C7180 (Retailing and distribution)

12/5/15 (Item 15 from file: 2)
DIALOG(R)File 2:INSPEC

02491757 INSPEC Abstract Number: C85035982
Title: Safety stock **planning in a multi-stage production-** inventory **system**
Author(s): Kelle, P.
Author Affiliation: Comput. & Autom. Inst., Hungarian Acad. of Sci., Budapest, Hungary
Journal: Engineering Costs and Production Economics vol.9, no.1-3 p.231-7
Publication Date: April 1985 Country of Publication: Netherlands
CODEN: ECPEDE ISSN: 0167-188X
U.S. Copyright Clearance Center Code: 0167-188X/85/$03.30
Conference Title: Proceedings of the Third International Working Seminar on Production Economics
Conference Date: 20-24 Feb. 1984 Conference Location: Igls/Innsbruck,

Austria
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: The **safety stocks** of internal stores are analysed in a production line. Production may often be disturbed by random factors such as machine failures, faulty products, breakdowns, etc. In this case both the **demand** and delivery process of each internal store have to be described by random processes, mostly by random step functions. If there is considerable random influence in the production process, a great difficulty for the production managers is to provide for continuous production with reasonable in-process **inventories** . Stochastic programming models have been formulated for the minimization of the **total** capital invested in **safety stocks** under prescribed probability constraints subject to the continuous supply of each stage of production. Based on the asymptotic distribution of the shortage probability, simple deterministic methods have been derived for the approximate solution and they have been applied in practice. (11 Refs)
Subfile: C
Descriptors: production control; random processes; stochastic programming ; stock control
Identifiers: multistage production- **inventory** system; stochastic programming; **safety stocks** ; internal stores; production line; **demand** ; delivery; random processes; production managers
Class Codes: C1140Z (Other and miscellaneous); C1180 (Optimisation techniques); C1290F (Industry)

12/5/16 (Item 16 from file: 2)
DIALOG(R)File 2:INSPEC

01965692 INSPEC Abstract Number: C83002710
Title: Using computer simulation to develop optimal inventory **policies**
Author(s): Gaither, N.
Author Affiliation: Dept. of Business Analysis & Res., Texas A&M Univ., College Station, TX, USA
Journal: Simulation vol.39, no.3 p.81-7
Publication Date: Sept. 1982 Country of Publication: USA
CODEN: SIMUA2 ISSN: 0037-5497
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: A method is presented for simultaneously determining order points and order quantities for materials stocked to meet an uncertain and independent **demand** . A computer simulation procedure minimizes **total** annual costs (carrying, ordering, incoming transportation, acquisition, **safety stock** carrying, and expected stockout), for individual stock keeping units. This method allows for the interdependence of order points and order quantities, a comprehensive range of costs as decision criteria, discontinuous cost functions, and optimal solutions for discrete units. Flowcharts document the procedure, and cost tables of actual applications demonstrate the results of the model. (8 Refs)
Subfile: C
Descriptors: digital simulation; stock control data processing
Identifiers: computer simulation; optimal **inventory** policies; order points; order quantities; carrying; ordering; transportation; acquisition; **safety stock** carrying; stockout; stock keeping units; decision criteria; discontinuous cost functions
Class Codes: C7160 (Manufacturing and industry)

12/5/17 (Item 17 from file: 2)
DIALOG(R)File 2:INSPEC

01830804 INSPEC Abstract Number: C82013984
Title: Inventory **placement in a two-echelon** inventory **system: an application**
Author(s): Rosenbaum, B.A.
Author Affiliation: Eastman Kodak Co., Rochester, NY, USA
Book Title: Multi-level production/ **inventory** control systems: Theory and practice p.195-207
Editor(s): Schwarz, L.B.
Publisher: North-Holland, Amsterdam, Netherlands
Publication Date: 1981 Country of Publication: Netherlands x+398 pp.
ISBN: 0 444 86096 7
Language: English Document Type: Book Chapter (BC)
Treatment: Theoretical (T)
Abstract: Deals with the application of a heuristic model which was developed to aid in determining **safety - stock** placement in the Eastman Kodak Company's two-level finished goods **inventory** systems. Within the company's **inventory** control systems, **safety - stock** quantities are based upon service levels which are individually set at each location. The heuristic model was developed to compute that combination of location service levels which minimizes **total** company **safety - stock inventory** while ensuring that a specified percentage of customer **demand** will be filled from on-hand **inventory** at the location where the **demand** occurs. The heuristic was recently tested on a sample of products at Kodak over a period of six months. The paper concentrates on a discussion of the field test and its results. (0 Refs)
Subfile: C
Descriptors: stock control
Identifiers: **inventory** placement; two-echelon **inventory** system; heuristic model; **safety - stock** placement; **inventory** control systems; location service levels
Class Codes: C1290F (Industry)

12/5/18 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01673036 ORDER NO: NOT AVAILABLE FROM UNIVERSITY MICROFILMS INT'L.
ANALYSIS OF A PRODUCTION- INVENTORY **SYSTEM UNDER A STATIONARY** DEMAND **PROCESS AND FORECAST** UPDATES
Author: TOKTAY, LATIFE BERIL
Degree: PH.D.
Year: 1998
Corporate Source/Institution: MASSACHUSETTS INSTITUTE OF TECHNOLOGY (0753)
Supervisor: LAWRENCE M. WEIN
Source: VOLUME 59/10-B OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 5561.
Descriptors: OPERATIONS RESEARCH ; BUSINESS ADMINISTRATION, GENERAL
Descriptor Codes: 0796; 0310

This thesis contributes to models in **inventory** theory which aim to incorporate more realistic assumptions about the operating characteristics of the manufacturing environment. The demands that a manufacturer faces are usually correlated in time. Information provided by the forecasting process

is used to determine order releases. Typically, forecasts are revised in every period, and orders are updated accordingly. It is necessary to keep **safety stock** due to limited production capacity and **demand** stochasticity.

We present a model that captures these characteristics, namely a model of a capacitated production- **inventory** system operating under a stationary **demand** process and using forecast updates to determine production order releases. The number of order releases in each period equals the change in forecasts for demands over a planning horizon. This release rule leads to a modified base-stock level policy. We show that the optimal base-stock level which minimizes **total** expected **inventory** holding and backorder costs is given by a newsboy-type solution.

We assess the impact of information quality on **total** cost within this framework. We show that forecast model mid-specification and forecast bias lead to significant cost suboptimality. We prove that among two forecasting schemes identifying the same **demand** structure, the one with less variance in the **total** forecast error over the forecast horizon will lead to lower **safety stock** .

We then analyze the impact of how the available information is used. We find that **aggregating** forecasts over time can reduce the **total** expected cost even if forecast bias is unrecognized. We demonstrate that the **total** cost decreases monotonically with the length of the planning horizon. This cost improvement vanishes as the system reaches full utilization.

An interesting conclusion follows from comparing the two areas of forecast quality and forecast use. Operational decisions regarding the usage of available information such as the length of the planning horizon and the **aggregation** level can improve system performance, but the relative cost improvement thus obtained is low with respect to the improvement achieved by correct forecast model specification. We conclude that the main value of forecasting is the specification stage. (Copies available exclusively from MIT Libraries, Rm. 14-0551, Cambridge, MA 02139-4307. Ph. 617-253-5668; Fax 617-253-1690.)

12/5/19 (Item 2 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01402231 ORDER NO: AADAA-I9509897
INVENTORY **INVESTMENT DYNAMICS: A HETEROGENEOUS COUPLING EXPLANATION (PRODUCTION SMOOTHING)**
Author: ALLEN, DONALD ST CLAIR
Degree: PH.D.
Year: 1994
Corporate Source/Institution: WASHINGTON UNIVERSITY (0252)
Chairperson: EDWARD GREENBERG
Source: VOLUME 55/11-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 3574. 121 PAGES
Descriptors: ECONOMICS, GENERAL; ECONOMICS, COMMERCE-BUSINESS; BUSINESS ADMINISTRATION, MANAGEMENT
Descriptor Codes: 0501; 0505; 0454

Inventory investment appears to have a major impact on the movement of **aggregate** output during the downturn in business cycles. Some recent empirical evidence has raised doubts about the often used assumption of a **buffer - stock** /production smoothing motivation for **inventory** . Work by Blinder and Maccini suggests that the use of an (S,s) or intermittent adjustment decision rule better explains the stylized facts of the dynamics of **inventory** investment. This has led to the focus on the (S,s) as an

alternative to the production smoothing incentive. Michael Lovell, on the other hand, simulated 84 interacting firms in 21 industries and concluded that the ratio of the variance of sales to the variance of output can be an unreliable indicator of the degree of smoothing by firms.

I propose that some agents use the (S,s) adjustment rule while others do attempt to smooth production in the face of convex costs and uncertain **demand** . I simulate the interaction of heterogeneous agents (representing manufacturing, wholesale and retail agents) with different **inventory** decision rules to demonstrate that the stylized facts can be explained by a disaggregated model with vertical coupling between agents. The simulation recognizes the diversity of motivations for holding **inventory** , in conjunction with potentially distinct cost curves. Thus rational agents who face different cost curves maximize profits intertemporally with different **inventory** decision rules. Retailers and wholesalers may face costs where fixed costs of ordering dominate and are more likely to find (S,s) rules as optimal. Manufacturers are more likely to face convex costs and are likely to use a production smoothing rule.

The dissertation also examines the impact of **aggregation** on the variability of production relative to sales and finds that **aggregation** biases the variability downwards for (S,s) agents and upwards for production smoothing agents.

12/5/20 (Item 3 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01364131 ORDER NO: AAD94-19617
A STUDY OF SCHEDULE NERVOUSNESS IN MULTI-LEVEL MRP SYSTEMS UNDER DEMAND **UNCERTAINTY**

Author: KADIPASAOGLU, SUKRAN NILVANA
Degree: PH.D.
Year: 1993
Corporate Source/Institution: CLEMSON UNIVERSITY (0050)
Adviser: V. SRIDHARAN
Source: VOLUME 55/03-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 640. 332 PAGES
Descriptors: BUSINESS ADMINISTRATION, MANAGEMENT; BUSINESS ADMINISTRATION, GENERAL
Descriptor Codes: 0454; 0310

Frequent changes in production schedules is a problem referred to as nervousness. Too many changes in schedules may increase costs and reduce productivity. Nervousness in schedules is caused by uncertainties in **demand** and/or supply and/or dynamic lot-sizing. Several strategies have been recommended to reduce nervousness in schedules. Prior studies examining the effectiveness of these strategies focused mostly at the end-item level and considered deterministic **demand** conditions. The evaluation of the strategies in multi-level MRP systems and under uncertain **demand** conditions remains to be investigated.

This study evaluates three nervousness dampening strategies, freezing, using **safety stock** at the end-item level, and using a lot-for-lot strategy below level 0, in terms of cost, instability and customer service level. The three strategies are evaluated under different levels of operating factors such as item cost structure, product structure, lot-sizing procedure and **demand** uncertainty. The impact of varying freeze length and **demand** forecast variability is also investigated.

The results indicate that freezing is a very effective strategy in terms of reducing both instability and cost. However it reduces service level to some extent. **Safety stock** provides similar benefits but to a

limited extent. The lot-sizing procedure affects the choice of a strategy to a great extent. Using a fixed quantity ordering policy (EOQ) at lower levels creates **inventory** remnants and increases cost considerably, which may exceed the cost reduction from the elimination of nervousness.

Sensitivity analysis results suggest that full benefits of freezing can be achieved when the whole **cumulative** lead time is frozen. Increasing **demand** variability does not alter the relative performance of strategies in terms of any of the criteria. Investigation of approaches to integrate **safety stock** and freezing strategies, as well as integrating freezing with an ordering policy that orders exact requirements at lower levels seem to be potential avenues for further research.

12/5/21 (Item 4 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01234416 ORDER NO: NOT AVAILABLE FROM UNIVERSITY MICROFILMS INT'L.
CAPACITY ALLOCATION AND SAFETY STOCKS **IN MANUFACTURING SYSTEMS**
Author: ATHAIDE, CHRISTOPHER
Degree: PH.D.
Year: 1992
Corporate Source/Institution: MASSACHUSETTS INSTITUTE OF TECHNOLOGY (0753)
Supervisor: STEPHEN C. GRAVES
Source: VOLUME 53/04-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 1208.
Descriptors: BUSINESS ADMINISTRATION, MANAGEMENT; OPERATIONS RESEARCH
Descriptor Codes: 0454; 0796

In Chapter Two, we examine the following question: Consider a manufacturing system with n stages. If there were a fixed number K of capacity units available, how should this capacity be allocated among the different stages so that the **total inventory** at all the stages is minimized? We show that the WIP **inventory** vector for the n stages can be represented by an n-dimensional stochastic differential equation. We formulate the optimization problem and show that the optimal capacity allocation at each stage is similar to the square root and other formulae obtained for queueing networks. We are also able to obtain expressions for the corresponding lead time at each stage. We then provide tradeoff curves for the WIP **inventory** , **safety stock** , base **stock** and lead time as a function of the **total** capacity K.

In Chapter Three, we consider a discrete time model of a single production stage with a fixed processing capacity which processes two nonsubstitutable items. The question that we ask is the following: Should these items be produced on a single machine, or on two separate machines? But if one were to use a criterion, say, to minimize the **total** WIP and **safety stock** , it is not clear which alternative is preferable. We are able to specify the conditions on the mean and variance of the **demand** for each item under which either a single machine or two machines are appropriate.

In Chapter Four, we characterize the production function using a capacitated rule and propose a model to study WIP **inventory** levels and **safety stocks** for a single stage. The questions that we consider are the following: What should be the level of **safety stocks** so that a certain level of service is provided? What is the distribution of the WIP **inventory** in steady state? We represent the WIP **inventory** process in terms of a stochastic differential equation. We show that under certain conditions on the parameters and the initial state of the process, the WIP **inventory** process has an ergodic distribution. (Copies available

exclusively from MIT Libraries, Rm. 14-0551, Cambridge, MA 02139-4307. Ph. 617-253-5668; Fax 617-253-1690.) (Abstract shortened with permission of school.)

12/5/22 (Item 5 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01170751 ORDER NO: AAD91-23981
PRODUCTION PLANNING AND CONTROL FOR THE STOCHASTIC ECONOMIC LOT SCHEDULING PROBLEM (SCHEDULING)
Author: BOURLAND, KARLA ELAINE
Degree: PH.D.
Year: 1991
Corporate Source/Institution: THE UNIVERSITY OF MICHIGAN (0127)
Chair: CANDACE YANO
Source: VOLUME 52/03-B OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 1652. 156 PAGES
Descriptors: ENGINEERING, INDUSTRIAL
Descriptor Codes: 0546

We address the stochastic economic lot scheduling problem (SELSP) and use it as the context for studying planned idle time as a buffer against **demand** uncertainty and related issues. In the SELSP several different parts are produced, one at a time, on a single machine, and changing from one part to another consumes capacity. Demands are random but must be satisfied on time whenever possible, using overtime if necessary. Long changeover times make frequent changeover in response to uncertainty impractical, and planning for uncertainty desirable. We develop a two-level hierarchical approach--a planning problem and a control problem.

Modeling the major tradeoffs in the SELSP planning problem requires a better understanding of the deterministic- **demand** version of the problem. We present a formulation that illustrates the relationships among existing solution approaches. We show computationally that one approach gives superior results and gives an improved lower bound on the optimal schedule for a fixed sequence.

In the SELSP, we need a tractable and realistic approach to modeling first-passage-time (or runout-time) distributions in a production setting. We present our method in the context of a continuous-review **inventory** system where demands are random, and where the lead time can be reduced at a cost. We optimally set the production quantity, reorder point, and lead time.

With this practical approach to modeling first-passage-time distributions, in the SELSP planning problem we simultaneously set the **safety stock** levels, set the **total** planned idle time, and allocate it within the schedule. In addition to providing a practical procedure for fixing production targets, we analyze the relative benefit of **safety stocks** and idle time. We demonstrate (analytically and computationally) that idle time can be a costly alternative to **safety stock** and discuss the reasons.

We use the results of our planning problem as a production plan, and examine different strategic approaches to the use of planned idle time in the SELSP. We develop and test three control algorithms that also use different elements of the plan to guide decisions about how much to produce and whether to produce on overtime. We show computationally that matching planned **inventory** levels through time is preferable to the other methods.

12/5/23 (Item 6 from file: 35)

DIALOG(R)File 35:Dissertation Abs Online

01165325 ORDER NO: AAD91-21331
A METHODOLOGY FOR DELIVERY OPERATIONS PLANNING (OPERATIONS PLANNING, INVENTORY **, LOGISTICS)**
Author: CHIU, HSIEN-MING
Degree: PH.D.
Year: 1990
Corporate Source/Institution: UNIVERSITY OF MARYLAND (0117)
Director: JOSSEF PERL
Source: VOLUME 52/02-B OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 966. 202 PAGES
Descriptors: ENGINEERING, CIVIL; OPERATIONS RESEARCH
Descriptor Codes: 0543; 0796

Delivery operations represent an expensive component of many distribution systems. Consequently, an improvement in the management of delivery operations can provide substantial cost savings. The purpose of this study is to develop a methodology which represents explicitly the interdependence between delivery decisions and **inventory** decisions.

The Delivery Operation Planning Problem (DOPP) is defined as the problem of determining the resources required to perform the delivery operations, fleet size and mix, allocation of **demand** points to routes, structure of each route, and delivery frequency on each route, such as to minimize the sum of delivery cost and **inventory** cost.

A mathematical representation of the DOPP is formulated as a non-linear programming model with integer variables. The proposed DOPP model differs from existing delivery operations planning models in three important aspects. First, it recognizes and represents the interdependence between delivery decisions and **inventory** decisions at both the tactical and operational levels. Second, it considers **safety stock** cost. Third, it explicitly represents in-transit **inventory** cost.

The proposed solution method for the DOPP is based on decomposing it into three subproblems. Node Routing Problem (NRP), Resource Allocation Problem (RAP), and Route Improvement Problem (RIP). Each of the three subproblem models is shown to be a component of the DOPP model. The solution process starts by solving the NRP to provide an initial route structure with minimum routes' length. The RAP is then solved to determine the assignment of vehicle types to the routes and the operating frequency on each route. Based on the RAP solution, the RIP is then solved to improve the DOPP solution by modifying the routes' structure.

It is shown that the DOPP solution method provides valid solutions to test problems of different sizes, and produces reasonable and consistent responses to changes in **demand** characteristics, fleet size and mix, and **inventory** policy. It is also demonstrated that a simultaneous optimization of delivery decisions and **inventory** decisions leads to a significant reduction in the **total** delivery operation cost, relative to a component-by-component approach in which delivery decisions and **inventory** decisions are considered sequentially.

12/5/24 (Item 7 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

1036255 ORDER NO: AAD89-00683
OPTIMAL DISTRIBUTION NETWORK CONFIGURATION FOR THE SINGLE-COMMODITY, SINGLE-SUPPLIER, W-DISTRIBUTION POINT, N-RETAILER SYSTEM
Author: KEM, DALE ALBERT

Degree: PH.D.
Year: 1988
Corporate Source/Institution: PURDUE UNIVERSITY (0183)
MAJOR PROFESSOR: FREDERICK T. SPARROW
Source: VOLUME 49/10-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 4481. 403 PAGES
Descriptors: ENGINEERING, INDUSTRIAL
Descriptor Codes: 0546

This research examines single-commodity, single-supplier, N-retailer distribution systems that include any number of W possible non-stocking distribution points. The centrally-controlled system operates in a periodic-review base-stock replenishment environment required to attain a pre-specified customer service-level. Each of the N non-identical retailers supply normally distributed **demand** and is served directly from the supplier or through one of the W distribution points.

Inventory costs are assessed on the **safety** **stock** and in-transit **inventories** . Transportation costs are assessed as a function of distance and **total** shipment weight. The per-unit transportation cost is a decreasing function of shipment weight. A constant per-unit cost is assessed for goods processed by any distribution point. Transit time, a surrogate for **inventory** leadtime, is a function of distance and also shipment weight.

A primary objective of this research is to demonstrate the dependency between the **inventory** model decisions and the transportation and warehousing model decisions and the effect of this dependency on the **total** system expected cost of a distribution system. More specifically, it is desired to demonstrate that the optimization of a distribution system with respect to only the **inventory** costs without taking into account the effect of **inventory** routing decisions on the transportation and warehousing costs as well as the transit times (i.e., leadtimes) resulting from the routing decisions, will, in most cases, lead to a sub-optimal solution. Similarly, optimization with respect to only the transportation and warehousing costs while ignoring the impact of the transportation decisions on the **inventory** costs may also lead to a sub-optimal solution.

The information gained from the examination of both the source and the magnitude of the dependency between the **inventory** , transportation, and warehousing considerations will be valuable in attaining another primary objective of this research which is the identification of the distribution system that minimizes the **total** expected cost per order cycle. In order to attain the second objective, a multi-phased heuristic is developed and tested. The results of the tests demonstrating the value of the heuristic and the insights provided by these tests are presented.

12/5/25 (Item 8 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

0965502 ORDER NO: AAD87-21453
THE DESIGN AND PERFORMANCE OF MASTER PRODUCTION SCHEDULING TECHNIQUES FOR ASSEMBLE-TO-ORDER PRODUCTS
Author: TALLON, WILLIAM JOSEPH
Degree: PH.D
Year: 1987
Corporate Source/Institution: THE UNIVERSITY OF IOWA (0096)
Source: VOLUME 48/07-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 1833. 300 PAGES
Descriptors: BUSINESS ADMINISTRATION, MANAGEMENT
Descriptor Codes: 0454

Manufacturing firms that produce custom made products are often required to provide a wide variety of end product configurations within a relatively short delivery lead time. This delivery time may be shorter than the **total** time required to produce the final product. A large diversity of end products frequently prohibits the use of finished product **inventories** as a means to provide short customer lead times. Such conditions may require the firm to master schedule at a product option level and assemble products as customer orders are received.

The manufacture of assemble-to-order (ATO) products present special problems to the master production scheduling (MPS) activity of the firm. The determination of time forecasts and master schedules can be difficult for large, complex end products. The selection of the MPS items and the MPS technique to adopt can have a significant impact on the operating performance of the company.

This thesis addresses the problems faced by producers of ATO products by: (1) developing a computer based procedure for analyzing the product structures of complex ATO products and determining MPS planning bills of material; (2) presenting an application of the procedure at an ATO company; (3) reporting the results of a series of simulation experiments which compared the performance of four different MPS techniques in terms of **total inventory** level and customer service level.

The results of this research indicate that: (1) a computerized approach for analyzing complex products to determine MPS planning bills of material is feasible and can be applied efficiently in actual operating environments; (2) all of the MPS techniques studied perform approximately the same when end product **demand** is known with perfect certainty over the planning horizon; (3) the use of super and modular bills result in improved operating performance (in comparison with end product and percentage bills) when uncertainty occurs in end product **demand** from period to period over the planning horizon; (4) the use of super bills results in minimum levels of **total inventory** and the use of modular bills results in maximum levels of customer service as **safety stock** is added to buffer **demand** uncertainty.

12/5/26 (Item 9 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

909508 ORDER NO: AAD86-04629
A REEXAMINATION OF THE INVENTORY **BUFFER EFFECT WITH DISAGGREGATED DATA**
Author: HARRIS, ETHAN SCHLOZER
Degree: PH.D.
Year: 1985
Corporate Source/Institution: COLUMBIA UNIVERSITY (0054)
Source: VOLUME 47/01-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 249. 154 PAGES
Descriptors: ECONOMICS, GENERAL
Descriptor Codes: 0501

In recent years **inventory** theorists have questioned the empirical validity of the traditional **buffer stock** model. The traditional model is not only imcompatible with the basic stylized facts of **aggregate inventory** behavior, but in regression equations it inevitably yields contradictory parameter estimates. On the one hand, they suggest that there is no buffer effect: firms immediately change production and restock **inventories** to meet unforeseen sales fluctuations. On the other hand, production doesn't appear to respond at all to changes in the long-run **inventory** target. This attack on the received theory is particularly

disruptive in that no convincing alternative theory has been found.

In this thesis I defend the traditional model by first critiquing previous empirical work and then presenting strong new evidence in support of the **buffer stock** motive. I show that **aggregate inventory** data is inappropriate for testing the model because of (1) measurement error, (2) **aggregation** bias, and (3) inadequacies in the traditional theory as a model of macro behavior. I then show that the **buffer stock** model is strongly supported by industry data.

The industry data show that **demand** buffering--of both seasonal and unexpected fluctuations in **demand** --is the primary function of **inventories** at the micro level. This result holds for virtually all industries and is robust to changes in specification and estimation methods. Unfortunately these strong micro findings do not necessarily carry-over to the macro level. Severe measurement error and simultaneity problems will continue to plague macro **inventory** models regardless of the strength of their micro foundation.

12/5/27 (Item 10 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

876513 ORDER NO: AAD85-06609
A PILOT STUDY OF SAFETY STOCK **PROBLEMS IN MRP SYSTEMS (** INVENTORY **SYSTEMS, OPERATIONS MANAGEMENT)**
Author: CHU, CHAO-HSIEN
Degree: PH.D.
Year: 1984
Corporate Source/Institution: THE PENNSYLVANIA STATE UNIVERSITY (0176)
Source: VOLUME 46/01-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 194. 192 PAGES
Descriptors: BUSINESS ADMINISTRATION, GENERAL
Descriptor Codes: 0310

Safety stock , also known as **buffer stock** , was introduced a long time ago to protect order point systems against uncertainty. As more and more studies have shifted to MRP systems, the problem has regained attention. A review of the literature indicates that the behavior of **safety stock** in MRP systems is still not well-understood, and that discrepancies in practice can usually be found. The following questions are to be answered in this study: Why bother to have **safety stock** ? Which factors should be considered in **safety stock** decisions? Where should **safety stock** in a multi-level system such as MRP be placed?

A computer simulation is selected as a vehicle for the study. The factors examined and simulated are: **demand** pattern, part commonality, degree of uncertainty, **safety stock** policy, and cost parameters. The performance of the system is measured by fill rate and the **total** cost. To simplify the experiment, a 1/3 of fractional factorial design is developed for the pilot study, from which two main designs, each with four factors, are conducted.

The study shows that under the hypothetical MRP system, **safety stock** is required for protecting the system against uncertainty, and that placing **safety stock** at the end items is a better policy than setting **safety stock** at lower levels. Regarding the factors to be considered in **safety stock** decisions, it was found in this study that **demand** pattern, degree of uncertainty, and **safety stock** policy are all highly significant to service level and **total** cost at the 0.01 level. Part commonality is only significant to the service-level criterion. Though it seems obvious that cost parameters are highly significant if **total** cost

is the measure of performance, we found that cost parameters has no influence at all on service level.

Since the experiment is conducted under several assumptions, the results could perhaps be data-specific. It is dangerous to extrapolate the analysis beyond the limitations of this investigation; thus, further studies in this area are proposed.

12/5/28 (Item 11 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

857857 ORDER NO: AAD84-23267
A STOCHASTIC THEORY OF THE FIRM
Author: LI, LODE
Degree: PH.D.
Year: 1984
Corporate Source/Institution: NORTHWESTERN UNIVERSITY (0163)
Source: VOLUME 45/07-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 2215. 179 PAGES
Descriptors: ECONOMICS, THEORY
Descriptor Codes: 0511

In this study we reformulate the classical theory of the firm in order to account for the dynamic and stochastic effects pervading the real world. We introduce, in a continuous time framework, competitive as well as monopolistic models of make-to-stock firms under **demand** and production uncertainties. The basic assumption is that **cumulative** production and **cumulative** **demand** are governed by two counting stochastic processes with random intensities parameterized by production capacity and price respectively. The optimal operating and/or pricing policies (short-run decisions) and the optimal production capacities (long-run decisions) are explored by the applications of a two-stage optimization device.

The firm's behavior is strongly influenced by the presence of stochastic variability. Stochastic variability provides an incentive for the firm to hold positive **inventory** if it is possible to do so. The optimal **inventory** limit is explicitly determined as a function of other parameters. This optimal **inventory** limit will be stochastic if there is any environmental trend. For instance, it is a decreasing stochastic process as a function of **cumulative** output in the presence of learning effects.

Secondly, it is shown that a monopoly under uncertainty always charges higher prices than it would in the absence of uncertainty. However, this impact of uncertainty on monopolistic pricing is moderated when there are learning effects.

Some issues of economic of multiple-use resources are examined in the context of a model under uncertainty similar to the basic stochastic model. By introducing multi-purpose work stations, the firm may reduce its **buffer** **stocks** and increase expected profit.

The deterministic models and the diffusion models may be taken as the limits of the stochastic models of the firm in this study. The conditions under which the classic model or the diffusion model applies are better understood when these limiting operations are carefully formulated.

12/5/29 (Item 12 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

852320 ORDER NO: AAD84-15845

OPERATIONS MANAGEMENT MODEL TO ANALYZE MANUFACTURING STRATEGIES (INVENTORY **, MRP, COMMONALITY)**

Author: MCCLELLAND, MARILYN KAY
Degree: PH.D.
Year: 1984
Corporate Source/Institution: THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL (0153)
Source: VOLUME 45/06-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 1812. 473 PAGES
Descriptors: BUSINESS ADMINISTRATION, GENERAL
Descriptor Codes: 0310

Although more and more practitioners and scholars recognize the influence of manufacturing strategy on the performance of the firm, very little research has been done on manufacturing strategies.

This thesis developes a model of a make-to-order manufacturer that uses material requirements planning to schedule the production of components and the procurement of purchased parts. We assume a modular subassembly product structure, and we assume that the promise time must be about one-half to two-thirds of the **cumulative** leadtime in order for the manufacturer to be competitive in the industry. The model contains uncertainty in customer **demand**, uncertainty in the procurement of materials, and uncertainty in all the manufacturing processes.

The model provides a tool that can be used to analyze alternative strategies. The issues for manufacturing strategy that we investigated include the procurement of additional **inventory**, product redesign, process redesign, and the enhancement of information systems. We conducted five experiments using the model.

In the first experiment, we studied the effect of uncertainty on a deterministic system by having only one parameter with uncertainty in the model at a time. We found that procurement uncertainty is very detrimental to the performance, but it is easily relieved by incorporating a small amount of purchased parts **safety stock**.

In the second experiment, we explored the opportunities for improving performance in a stochastic model by selectively changing stochastic parameters to deterministic parameters. Then we explored the maximum possible improvement available through uncertainty reduction. We observed that there is more benefit to reducing uncertainty in some parameters than in others. For example, uncertainty reduction in assembly has a greater positive impact on performance than a comparable uncertainty reduction in fabrication. Given a limited budget for investment in improving the manufacturing process, it would be desirable to improve the assembly process before the fabrication process is improved.

We analyzed holding **safety stock** at different levels in the product structure in the third experiment. We found that the subassembly level is the effective place to keep **safety stock** for low to moderate **safety stock** levels. . . . (Author's abstract exceeds stipulated maximum length. Discontinued here with permission of author.) UMI

12/5/30 (Item 13 from file: 35)

DIALOG(R)File 35:Dissertation Abs Online

843344 ORDER NO: AAD84-11514

AGGREGATION **OF (S(CAPITAL), S(LOWER CASE))** INVENTORY **POLICIES**

Author: CAPLIN, ANDREW STEPHEN

Degree: PH.D.
Year: 1983
Corporate Source/Institution: YALE UNIVERSITY (0265)
Source: VOLUME 45/02-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 594. 165 PAGES
Descriptors: ECONOMICS, THEORY
Descriptor Codes: 0511

In 1951 Arrow, Harris and Marschak introduced the (S, s) **inventory** policy. The policy involved the **inventory** holder placing orders in bulk. It is thus appropriate when there are economies of large scale ordering, as in the retail sector.

The dissertation provides general results of the implications of (S, s) policies in the **aggregate** , and applies them to the retail sector.

In the model, retailers increase the volatility of **demand** , with the variance of their orders exceeding the variance of their sales. Formulae are provided for computation of the increase in variance.

The autocorrelation in retail sector orders is shown to be negative, despite an assumed lack of serial correlation in consumers' **demand** . Also, retailers orders are a mean preserving spread of that period's consumers' **demand** , and independent of prior levels.

Similar conclusions are drawn when the model is extended to the wholesale sector. The model is complementary to established theories of manufacturers **inventories** , such as the **buffer - stock** model.

The results are consistent with Blinder's empirical findings (1981), where the variance of deliveries to retailers was found to exceed the variance of final sales.

12/5/31 (Item 14 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

811057 ORDER NO: AAD83-12311
AN EXPERIMENTAL INVESTIGATION: UNCERTAINTY IN MRP SYSTEMS
Author: GRASSO, EDWARD THOMAS
Degree: PH.D.
Year: 1982
Corporate Source/Institution: VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY (0247)
Source: VOLUME 44/01-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 218. 149 PAGES
Descriptors: BUSINESS ADMINISTRATION
Descriptor Codes: 0310

Material Requirements Planning (MRP) has evolved as a technique for the planning and controlling of **inventories** and production of complex manufactured products. The problem addressed in this research is that of uncertainty in MRP systems. **Demand** uncertainties are those which involve variations in the gross requirements for a component. Supply uncertainties deal with variations in the scheduled receipts for a component.

The purpose of this research is to examine the impact of specific operating policies on the performance of an MRP system under conditions of supply/timing uncertainty. Supply uncertainties include either the timing or quantity type. Supply uncertainty that results because of timing involves the receipt of an order after its scheduled delivery date. The specific supply/timing uncertainty examined in this study is that which is caused by variability in the lead time of purchased parts. Experiments are conducted in order to assess the impact of lead time variability, the

amount of **safety stock** buffering, the amount of safety lead time buffering, and the lot-size rule on the average **total** cost of an MRP system. In addition, the question of whether the results obtained are sensitive to changes in the system's cost parameters is examined. Based on the results, guidelines are developed for practitioners to use when making decisions involving uncertainty in MRP systems.

The simulation model used in this research is a versatile MRP/Production simulator designed to provide a framework for the investigation of a wide variety of MRP related problems. The hypothetical manufacturing system is simulated and its average **total** cost is recorded for varying levels of lead time variability, **safety stock** , **safety** lead time, lot-size rule and the holding cost and lateness penalty values. A 3 x 5 x 3 x 3 balanced factorial experiment is performed and multifactor analysis of variance is used to assess significant differences in the average **total** cost of the MRP system. On those means judged significantly different by Duncan's multiple range test, further analysis is provided in the form of general linear contrasts and confidence intervals.

12/5/32 (Item 15 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

798570 ORDER NO: AAD83-00884
OPTIMAL INVENTORY **POLICIES FOR THE ONE WAREHOUSE, N-RETAILER SYSTEM**
Author: BADINELLI, RALPH DAVID
Degree: PH.D.
Year: 1982
Corporate Source/Institution: PURDUE UNIVERSITY (0183)
Source: VOLUME 43/08-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 2769. 255 PAGES
Descriptors: MANAGEMENT
Descriptor Codes: 0454

This research examines an **inventory** system consisting of one warehouse and N identical retailers. It is assumed that each facility in the system operates a continuous review (Q, R) replenishment policy, that all unmet **demand** is backordered, that the transportation lead times between the warehouse and its supplier and between the warehouse and the retailers are fixed, and that each retailer faces independent, unit Poisson **demand** . Furthermore, the retailers are identical in terms of lead time, **demand** rate, lot size, and reorder points.

The model of the system which is used in this study is the Deuermeyer-Schwarz model. Within the context of this model, the optimal allocation of **safety stock** among the warehouse and retailers is determined subject to a constraint on the **total** amount of **safety stock** in the system. This optimization is carried out under two different objective functions: fill-rate and expected backorders.

The results of this study are general statements about the form of these optimal policies, the characterization of the locus of optimal **safety stock** positions for all finite values of the constraint as a policy line in the two-dimensional policy space, insights into the effects of **safety stocks** in this system, and a highly accurate and simple heuristic for computing optimal **safety stock** positions.

12/5/33 (Item 16 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

770193 ORDER NO: AAD82-04262
MANUFACTURERS' DECISIONS ON PRODUCTION AND INVENTORY **LEVELS**
Author: WILLIAMS, MANSFIELD W.
Degree: PH.D.
Year: 1981
Corporate Source/Institution: RUTGERS UNIVERSITY THE STATE U. OF NEW JERSEY (NEW BRUNSWICK) (0190)
Source: VOLUME 42/09-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 4092. 309 PAGES
Descriptors: ECONOMICS, COMMERCE-BUSINESS
Descriptor Codes: 0505

One might have expected that the question implied by the title had already been answered? After all, micro-theory provides profit-maximizing rules under conditions of perfect competition. However, real world firms face uncertain **demand** , and instances of application of the micro rules are not readily found. In fact, as Baron has demonstrated, appropriate strategy for the risk-averse firm facing stochastic **demand** involves setting either volume or price, yet a further step from perfect competition. Nor, would the firm have need of **inventories** of finished goods, were **demand** certain, which probably accounts for **inventory** 's relative absence as a microtheory topic.

And, surprisingly, there has been little microtheory consideration of the role of financial factors in the decision process, although evidence abounds of their importance to firms.

Macrotheory does deal with **inventories** , because of the importance of **inventory** investment in macro-models. Metzler's celebrated contribution illustrated how **inventory** treatment could result in cyclical effects. More recent work has largely been econometric, with a variety of accelerator models aimed at **inventory** investment prediction. Largely, these studies have examined manufacturing in the **aggregate** , blurring the distinction between production to stock and production to order.

Macro studies might well have been more helpful in characterizing production behavior, except that their focus upon **inventory** investment has resulted in relatively simplistic treatment for the (related) production decision. This is reflected in part by the prevalence of models of single-output firms, which attempt to hold some "desired level of **inventory** ." And, the conventional **buffer stock** motive for holding **inventory** suggests implicitly that manufacturers are relatively incapable of estimating forthcoming sales and matching them with production level. The "production-smoothing" motive is only slightly more sophisticated, alleging that the firm's objective is simply to minimize changes in production level. The question posed, of course, by such explanations is whether they in fact reflect profit-maximizing behavior?

In this study, manufacturers' decisions on production and **inventory** levels have been empirically investigated. The behavior of nine two-digit industries, including four which produce to stock, and five producing to both stock and order, has been examined, using monthly and quarterly Census Bureau data over the 1958-1976 period. The first stage of the investigation follows Belsley's approach in separation of production to order from production to stock, and also in using linear decision rule techniques, developed by Holt, Modigliani, Muth, and Simon, to characterize cost-minimizing production decisions.

The results, which parallel Belsley's, confirm cost-minimizing behavior, and allow a substantial measure of inter-industry comparison in terms of behavior. For example, it is shown that the production to stock segment of the five industries employing both means of production is markedly similar in characteristics to the four industries producing (only)

to stock. However, comparisons involving the industries with both types of production function are qualitative, not quantitative, because of the lack of separation within the data base of the fractions of production and sales relevant to each activity.

In addition, the timing and accuracy of manufacturers' response to changes in **demand** was inspected, including seasonal, cyclical, and temporal. It was found that industries producing altogether, or largely, to stock, characteristically were able to closely match the (planned ahead) production level to actual sales, for any given month. Industries producing largely to order, on the other hand, characteristically showed lags in response to changes in new orders, and these were approximately measured. It was also demonstrated that the (typically) multi-product firm must hold **inventories** in anticipation of expected sales--quite the opposite of the buffer motive.

The role of financial stocks, as represented by the working capital of the firm, is also studied, using the FTC's quarterly financial data series. The empirical results obtained support the conclusion that a complete theory of firms' behavior must include financial stocks, as well as the flows of microtheory.

12/5/34 (Item 17 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

760583 ORDER NO: AAD81-24179
SAFETY STOCKS **IN MATERIAL REQUIREMENTS PLANNING SYSTEMS**
Author: YANO, CANDACE ARAI
Degree: PH.D.
Year: 1981
Corporate Source/Institution: STANFORD UNIVERSITY (0212)
Source: VOLUME 42/05-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 1999. 306 PAGES
Descriptors: ENGINEERING, INDUSTRIAL
Descriptor Codes: 0546

Material Requirements Planning (MRP) is a multi-echelon production-**inventory** control system which was designed to reduce work-in-process and raw materials **inventory** without increasing other costs. This is accomplished by using information about requirements, production leadtimes, and vendor leadtimes, in order to plan the arrival of shipments immediately prior to the need for them.

MRP was designed under the assumption of known requirements for the finished product, but MRP systems often operate in conditions of **demand** uncertainty. **Demand** uncertainty not only creates uncertainty about the quantity required, but may also create uncertainty about the timing of a requirement. The latter arises because the lot-sizing algorithm employed shifts the timing of a planned production run or order placement, or because emergency production or order setups may occur to avert shortages. A buffering mechanism is required if acceptable customer service levels and stable production schedules must be maintained.

We address the problem of determining cost-effective **safety stock** levels for each component in the MRP production structure of a single product, under conditions of stochastic **demand** . The objective is to minimize **total** setup and **inventory** holding costs subject to a service level constraint, where only the service level of the end-item is considered critical. Service level is measured in terms of percent of **demand** filled immediately from stock, often referred to as "fill-rate." We assume that no other uncertainty exists in the system. Neither purchase

quantities nor production capacity is constrained, and **demand** is assumed to be stationary.

Investigative simulation studies resulted in important findings which led to an algorithmic approach to the problem. First, it was found that too much flexibility in scheduling and the resulting emergency setups (setups occurring earlier than planned) are very costly. Second, there is a strong interaction between the scheduling policy and the role of **safety stock** . When emergency setups are not allowed, **safety stock** increases the service level but an increase of component **safety stock** is cost-effective (relative to end-item **safety stock**) only under special conditions. When emergency setups are permitted, an increase in **safety stock** may reduce emergency setups while maintaining, decreasing, or increasing the service level.

These findings motivated the development of two algorithms. The first determines approximately optimal **safety stock** levels in an environment where the production/order schedule is fixed for a relatively long duration and no emergency setups are allowed. The second algorithm determines approximately optimal **safety stock** levels for situations in which emergency setups are not permitted in the final assembly stage, but are permitted in the production/order schedule of the components which are the inputs to the last stage. The algorithms are based upon mathematical models of the relevant tradeoffs with respect to cost and service level.

Both algorithms are tested using simulation studies over a wide range of parameter values. The first algorithm provides good solutions in all situations of practical significance. The second provides near-optical solutions over a wide range of parameter values. These algorithms have been developed for normally distributed forecast errors, but can be modified easily for other forecast error distributions. Solutions can be obtained in a few seconds or less using computerized versions of the algorithms.

The contributions of this research are twofold. First, we have developed mathematical models of systems which heretofore have been analyzed by simulation, and for which only "rules of thumb" policies were available. Second, algorithms which are based on these mathematical models, and which provide good solutions over a wide range of situations, have been developed.

12/5/35 (Item 18 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

748384 ORDER NO: AAD81-13650
A MODEL OF INVENTORY **, OUTPUT, AND PRICE BEHAVIOR**
Author: BIVIN, DAVID GLENN
Degree: PH.D.
Year: 1980
Corporate Source/Institution: PURDUE UNIVERSITY (0183)
Source: VOLUME 42/01-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 293. 177 PAGES
Descriptors: ECONOMICS, GENERAL
Descriptor Codes: 0501

The thesis develops an optimization model of firm behavior in which the firm is assumed to maximize profits by setting **inventories** , price, and output at the beginning of each period subject to initial conditions (e.g., initial **inventories**) and expected **demand** .

The model departs from standard models of **inventory** investment in three respects. First, the objective of the firm is the maximization of profits rather than the minimization of costs. The use of profit

maximization removes the inconsistency associated with cost minimization models in which the firm is operating in a perfectly competitive market and yet somehow possesses a **demand** constraint. Additionally, it allows for the construction and estimation of a price equation.

The second departure is the explicit rejection of the **buffer stock** motive in the construction of the objective function. Typically, the **buffer stock** motive is introduced directly into the **inventory** cost function. The philosophy of this thesis is that if such a motive is appropriate, it should arise naturally out of the firm's attempts to maximize profits.

Finally, the model developed in the thesis differs from standard models of **inventory** investment in that the admissible parameter space is rigorously specified. Typically, parameter space restrictions are dictated by intuition rather than theory. The use of intuition is necessitated either by the lack of an underlying structure or by the complexity of the model. However, given the imperfect relationship between intuition and reality, the use of this methodology has led to the acceptance of counterintuitive results, or the incorrect specification of the admissible parameter space.

The formulation yields a reduced-form system in which output and price are expressed as linear functions of the lagged rate of production, lagged **inventory** holdings, lagged unfilled orders, and expected new orders in the current and following periods. The most interesting aspect of the derived parameter space restrictions is the rejection of the **buffer stock** motive. Rather, the theory implies that, with a finite horizon and positive unit quadratic costs of production, an increase in the steady state level of new orders will yield a decline in the steady state level of **inventories** . This is the result of increasing marginal costs which implies that firms will utilize all of the tools at its disposal in response to a perceived shift in its **demand** curve.

The theory is tested through the use of a standard F-test in which the residual sum of squares for the constrained model is compared to the residual sum of squares obtained through unconstrained generalized least squares estimation. Since the null hypothesis is composite, the constrained estimates are obtained through an iterative procedure rather than by standard linear programming techniques.

The data are real seasonally adjusted quarterly observations covering the period 1959:II-1977:IV for the 20 two-digit SIC manufacturing industries. Initial results indicated the presence of structural change in virtually all of the industries. As a result, each of the samples were divided into two sub-periods: 1959:II-1968:IV and 1969:I-1977:IV.

In **total** there were 35 samples appropriate for testing. The tests were conducted at the five percent level of significance. Of the 35 samples, 25 could not be rejected at this level. For the first sub-period, ten of the 18 samples could not be rejected, and for the second sub-period, 15 of the 17 samples could not be rejected.

12/5/36 (Item 19 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

746025 ORDER NO: AAD81-12061
AN EXAMINATION OF SAFETY STOCK **POLICIES IN MULTI-ECHELONED DISTRIBUTION SYSTEMS**
Author: COOK, ROBERT LORIN
Degree: PH.D.
Year: 1980
Corporate Source/Institution: MICHIGAN STATE UNIVERSITY (0128)

Source: VOLUME 41/12-A OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 5227. 210 PAGES
Descriptors: MARKETING
Descriptor Codes: 0338

An accurate determination of channel system **safety stock** requirements is desirable as one aspect of customer service policy. **Safety stock** is located throughout a distribution system to buffer uncertainties due to **demand** and lead time performance.

An accurate determination of **safety stock** requirements depends on two factors. (1) accuracy of the technique used to formulate **safety stock** policy; and (2) understanding the combined effects of **safety stock** and uncertainty on customer service. There has been little prior research which studies the customer service effects of **safety stock** levels and locations, particularly in multi-echeloned distribution systems. The objective of this research was to measure both the accuracy of a statistical approach commonly used for setting **safety stocks** and effects of alternate **safety stock** policies and uncertainty levels on customer service performance in single and multi-echeloned channel systems.

Two series of dynamic simulations were performed using a dynamic simulation model of a distribution channel. Numerous simulations were made using alternate combinations of **safe**ty stock policy and uncertainty level for both single and multi-echeloned channel systems. The customer service results were examined using a two-part analysis. The first part compared the simulated customer service results of both channel system designs to the customer service predicted by a statistical approach commonly used for setting **safety stocks** . The second part investigated the individual and combined effects of alternate **safety stock** policies and uncertainty levels on the simulated customer service results of each channel system. The following conclusions for **safety stock** planning and control were drawn from the research results. First, the statistical approach, for the most part, should not be used for setting **safety stocks** in single or multi-echeloned channel systems. In single echelon systems, the statistical approach did not accurately predict simulated customer service. Lead time uncertainty, as opposed to **demand** uncertainty, had the greatest effect on the relative accuracy of the statistical approach. In multi-echeloned systems, the statistical approach was also found to be inaccurate due, in part, to a failure to consider the interrelationship of **inventory** performance at sequential locations. The statistical approach does not consider **safety stock** location within the channel.

Safety stock level and location was found to have a significant effect on customer service in both single and multi-echeloned channel systems. In single echelon systems, the initial increments of **safety stock** provided the most significant increases in customer service, regardless of uncertainty level. In multi-echeloned systems, **safety stock** positioning had significant impacts on customer service. **Safety stocks** introduced at the lowest channel echelon resulted in higher customer service than **safety stocks** introduced at the second echelon. This difference in customer service increased as uncertainty level increased. Lower echelon **safety stock** additions increased customer service slowly, while additional increments of **safety stock** at the second echelon rapidly decreased in effectiveness. A second echelon positioning policy increased the probability that retail replenishment orders were filled, but second echelon **safety stocks** did not **buffer** lead time uncertainty between the two echelons.

Partial postponement of **safety stocks** at the second echelon resulted in higher customer service than either absolute postponement or absolute speculation because **inventory** is necessary at each echelon since

inventory performance at sequential locations is interrelated. This higher customer service was accomplished without increasing **safety stock** levels and carrying costs. Thus, a **total** channel approach to setting **safety stock** policy results in higher customer service performance for a given amount of **safety stock** .

12/5/37 (Item 20 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

733412 ORDER NO: AAD80-28857
EFFECTS OF COMMODITY PRICE STABILIZATION: AN ECONOMETRIC MODEL OF THE WORLD COTTON MARKET
Author: FRENCH, MARK WILLIAM
Degree: PH.D.
Year: 1980
Corporate Source/Institution: UNIVERSITY OF PENNSYLVANIA (0175)
Source: VOLUME 41/07-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 3202. 200 PAGES
Descriptors: ECONOMICS, COMMERCE-BUSINESS
Descriptor Codes: 0505

Over the last two decades, many of the developing countries have argued strongly the need to stabilize their revenues from primary commodity exports. Through the United Nations and other agencies, they have pushed for cotton price stabilization through an internationally coordinated cotton **buffer stock** . One purpose of this study is to measure the probable costs and benefits of operating such a program. The estimates of this study are obtained through the simulation of an econometric model of the world cotton market.

Previous stabilization analyses have been weakened by their reliance on two questionable assumptions, that: (1) Private **inventory demand** patterns were unchanged despite price stabilization, and (2) Production levels were unaffected by the reduction in price variability. To avoid these strong assumptions, the present study incorporates several improvements in methodology. First of all, risk aversion is explicitly introduced into the analysis. But the most important contribution of this study is its analysis of the implications of changing price expectations for the effectiveness of new government policy, in the form of a cotton **buffer stock** . If **inventory** holders have "rational" rather than static price expectations, effects of public policy will differ from traditional estimates.

An econometric model of the world cotton market has been estimated and simulated to answer questions about risk aversion, effects of U.S. agricultural policies on the international market, costs and effects of international price stabilization, and most important, the implications of new expectations patterns for the appropriate size of a U.N. **buffer stock** program.

Estimates of area and market share equations suggested that raw cotton producers show aversion to price risk more clearly than do cotton mills.

The U.S. export subsidy had a substantial impact on international markets--altering world production by 2% and world price by 20% on average.

With static expectations, base simulation estimates of size of stock and **total** financial requirements for a buffer program are in the same ballpark as the U.N. projections. (And this cotton price stabilization program would appear to stabilize cotton export revenues, as well.) But if price expectations are non-static, then effective buffer programs can be

smaller than projected in all past econometric simulation of commodity price stabilization.

12/5/38 (Item 21 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

687655 ORDER NO: AAD80-15434
DEVELOPMENT AND APPLICATION OF DECISION RULES FOR BUFFERING AGAINST DEMAND **UNCERTAINTY IN A TIME-PHASED REORDER POINT SYSTEM**
Author: CALLARMAN, THOMAS EVAN
Degree: PH.D.
Year: 1979
Corporate Source/Institution: PURDUE UNIVERSITY (0183)
Source: VOLUME 41/01-A OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 375. 187 PAGES
Descriptors: MANAGEMENT
Descriptor Codes: 0454

This research investigates the use of service level decision rules in a single stage time phased reorder point system. Time phased reorder point uses the forward-looking logic of Material Requirements Planning and offsets the order quantities for lead time.

The research uses multiple regression analysis for response surface mapping to develop models for buffering against **demand** quantity uncertainty. Several methods of buffering are used; including the use of **safety stock** , an inflated order cycle, and a combination of the two. The analysis relates two performance criteria, the **total** cost and the service level of the system to several factors that are operating characteristics of the firm and **demand** characteristics.

Several tests were performed to test the benefit of using the complex decision rules. Among these was a test against a simple linear model. The decision rule performed better than a simple linear model, but the decision rule is more complex computationally and more difficult to interpret.

This study is the first to develop procedures for determining the amount of buffering to use in this type of **inventory** system, and the major conclusion is that the use or **safety stock** is preferable to the use of other procedures.

12/5/39 (Item 1 from file: 99)
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs

1860382 H.W. WILSON RECORD NUMBER: BAST95061193
The effect of freezing the master production schedule on cost in multilevel MRP systems
Kadipasaoglu, Sukran N;
Production & Inventory Management Journal v. 36 no3 ('95) p. 30-6
DOCUMENT TYPE: Feature Article ISSN: 0897-8336 LANGUAGE: English
RECORD STATUS: Corrected or revised record

ABSTRACT: A study of the effect of freezing the master production schedule (MPS) on cost in multilevel materials requirement planning (MRP) systems under known and uncertain- **demand** conditions. Two sets of experiments were carried out. The first assumed that **demand** was known, whereas the

second included **demand** uncertainty. Under uncertain **demand** , freezing the MPS to cover the **cumulative** lead time prevents disruption in shop floor operations. Moreover, this strategy avoids emergency setups and leftover **inventory** due to schedule changes. Freezing the MPS is therefore beneficial in an environment where **demand** is predicted. One potential drawback is the deterioration in the service level when there is a projected stockout and schedule changes are not allowed. However, this may be solved by carrying **safety stock** at the end-item level.
DESCRIPTORS: Enterprise resource planning; Scheduling (Management);

12/5/40 (Item 1 from file: 256)
DIALOG(R)File 256:TecInfoSource

00132739 DOCUMENT TYPE: Review

PRODUCT NAMES: MFG/PRO (408379); ViaView (032808)

TITLE: The Benefits of Flexibility: Supply chain software provides tools...
AUTHOR: Cleary, Mike
SOURCE: Interactive Week, v8 n31 p27(2) Aug 13, 2001
ISSN: 1078-7259
HOMEPAGE: http://www.interactive-week.com

RECORD TYPE: Review
REVIEW TYPE: Product Analysis
GRADE: Product Analysis, No Rating

QAD.inc's MFG/PRO, along with Provia Software's ViaWare ViaView and other products, is used by Taylormade-Adidas Golf in an Internet-based supply chain system that is coordinated by i2 Technologies. This is part of a technology effort that also required internal process changes to be successful. A VP of global operations for TaylorMade says many companies realize that supply chain is a competitive tool, but fail to change their internal processes. When they can successfully reduce **inventory** , slim delivery cycles, and cut staff, supply chain efficiencies can add between 5 percent and 20 percent to revenues. One analyst reports that one high-tech company that he knows of expects a one-time saving of $100 million due to its supply chain program, which will require two years of implementation. Thereafter, the company expects to save $10 million each year. Corey Billington, VP of supply chain services for Hewlett-Packard, says many companies purchase **safety stock** (extra **stock** that can be used when **demand** is higher than expected), which is a material expense and usually becomes a very costly waste. **Aggregation** of supply chains, including business logic, views, and information, can allow users to use all types of supply chain data on the fly, which is not possible with rigid applications.

COMPANY NAME: QAD Inc (544523); Provia Software Inc (552526)
SPECIAL FEATURE: Charts
DESCRIPTORS: Business Process Management; Manufacturing; Supply Chain Management
REVISION DATE: 20040130
?

Set	Items	Description
S1	257	(SAFETY OR BUFFER)(2N)STOCK? ?
S2	9313	INVENTORY OR INVENTORIES
S3	60029	DEMAND
S4	4309480	SUPPLY OR SUPPLIES OR PRODUCE OR PRODUCTION OR MANUFACTUR?
S5	517798	CUMULATIVE OR AGGREGAT? OR TOTAL?
S6	2596393	VALUE? ? OR QUANTITY OR QUATITIES OR AMOUNT
S7	3240587	TIME OR PERIOD? OR DURATION? ?
S8	21	S1 AND S2
S9	662	S5(5N)S3
S10	1	S1 AND S9
S11	5923	S5(3N)S4
S12	3	S1 AND S11
S13	3	S10 OR S12

? show file
File 347:JAPIO Nov 1976-2005/Apr(Updated 050801)
(c) 2005 JPO & JAPIO
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200555
(c) 2005 Thomson Derwent

Considered
QJF 2/6/06

13/5/1 (Item 1 from file: 347)
DIALOG(R)File 347:JAPIO

07194523 **Image available**
PRODUCTION METHOD AND **TOTAL** STORAGE MANAGEMENT METHOD FOR PRODUCT

PUB. NO.: 2002-062926 [JP 2002062926 A]
PUBLISHED: February 28, 2002 (20020228)
INVENTOR(s): ASANUMA TADASHI
KIMURA SHIGERU
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APPLICANT(s): MITSUI CHEMICALS INC
GRAND POLYMER CO LTD
APPL. NO.: 2001-014454 [JP 200114454]
FILED: January 23, 2001 (20010123)
PRIORITY: 2000-125624 [JP 2000125624], JP (Japan), April 26, 2000 (20000426)
2000-174107 [JP 2000174107], JP (Japan), June 09, 2000 (20000609)
2000-174108 [JP 2000174108], JP (Japan), June 09, 2000 (20000609)
INTL CLASS: G05B-019/418; G06F-017/60

ABSTRACT

PROBLEM TO BE SOLVED: To provide an inexpensive production method satisfactorily deal with the daily and hourly changes in the quality market with a minimum possible stock.

SOLUTION: In a continuous production of multiple brands in the same production facility according to a production planning, products are produced according to the production planning determined so that the stock of each brand calculated according to a shipping planning and the production planning is not lower than each determined **safety stock** , and yet the sum of the product of the stock keeping cost by the transition quantity (the difference between the profit of the transition product and the average profit of a normal product) generated according to brand change is a minimum.

13/5/2 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015358410 **Image available**
WPI Acc No: 2003-419348/200339
XRPX Acc No: N03-334731
Capacity driven production planning method, involves computing manufacturing capacity of product and computing safety stock **level to cover uncertainity in demand over some period with target service level**
Patent Assignee: CALLIONI G (CALL-I); CARGILLE B D (CARG-I); JOHNSON M E (JOHN-I)
Inventor: CALLIONI G; CARGILLE B D; JOHNSON M E
Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20030050870	A1	20030313	US 2001953707	A	20010912	200339	B

Priority Applications (No Type Date): US 2001953707 A 20010912

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20030050870	A1		30	G06F-017/60	

Abstract (Basic): US 20030050870 A1

NOVELTY - The method involves computing manufacturing capacity for a product supplied by manufacturing line. The manufacturing capacity corresponds to a measure of manufacturing line responsiveness. A **safety stock** level for given product is computed based on manufacturing capacity measure. The **safety stock** level covers uncertainity in demand over an exposure period with a target service level.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a production planning system.

USE - Used in the manufacturing process for making inventory and manufacturing level decisions.

ADVANTAGE - The method enables production planners to view capacity decisions that affect **total production** costs and understand the cost trade offs between excess capacity and inventory.

DESCRIPTION OF DRAWING(S) - The diagram shows a distribution network that includes a factory that is configured to assemble finished goods from component parts that are received from suppliers and distribution center that stores sufficient levels of finished goods inventory to cover uncertainity in end customer demand with a target service level.

pp; 30 DwgNo 1/8

Title Terms: CAPACITY; DRIVE; PRODUCE; PLAN; METHOD; COMPUTATION; MANUFACTURE; CAPACITY; PRODUCT; COMPUTATION; SAFETY; STOCK; LEVEL; COVER; DEMAND; PERIOD; TARGET; SERVICE; LEVEL

Derwent Class: T01

International Patent Class (Main): G06F-017/60

File Segment: EPI

13/5/3 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

015194918 **Image available**

WPI Acc No: 2003-255454/200325

XRPX Acc No: N03-202613

Lean inventory management in product manufacturing industry, involves determining lean buffer stock **value representing quantity of product to use as lean** buffer stock **based on** cumulative demand **and** production **values**

Patent Assignee: I2 TECHNOLOGIES INC (ITWO-N)

Inventor: HAYES T R

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020178092	A1	20021128	US 2001832576	A	20010411	200325	B

Priority Applications (No Type Date): US 2001832576 A 20010411

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020178092	A1		13	G06F-017/60	

Abstract (Basic): US 20020178092 A1

NOVELTY - A **cumulative demand** value for a specific product at preset time period, is determined for different time period. A **production** value representing **cumulative** quantity of the product that can be manufactured at a preset time period, is determined for different time periods. A lean **buffer stock** value representing the quantity of product to use as lean **buffer stock** , is determined based on **cumulative demand** and **production** values.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) inventory management software; and

(2) inventory management system.

USE - Lean inventory management in product manufacturing industry.

ADVANTAGE - An appropriate amount of inventory needed to protect the manufacturer from customer demand spikes, is effectively determined. The manufacturer identifies the amount of inventory to keep as a lean **buffer stock** even when customer demand spikes occur during earlier time periods.

DESCRIPTION OF DRAWING(S) - The figure shows a lean inventory management system.

pp; 13 DwgNo 1/5

Title Terms: LEAN; INVENTORY; MANAGEMENT; PRODUCT; MANUFACTURE; INDUSTRIAL; DETERMINE; LEAN; BUFFER; STOCK; VALUE; REPRESENT; QUANTITY; PRODUCT; LEAN ; BUFFER; STOCK; BASED; CUMULATIVE; DEMAND; PRODUCE; VALUE

Derwent Class: T01

International Patent Class (Main): G06F-017/60

File Segment: EPI

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